CAMBRIDGE SYSTEMATICS

California High-Speed Rail Ridership and Revenue Model

Refinement and Recalibration of the MTC Intraregional Model

final technical memorandum

prepared for

California High-Speed Rail Authority

prepared by

Cambridge Systematics, Inc.

March 2010

www.camsys.com

final technical memorandum

California High-Speed Rail Ridership and Revenue Model

Refinements and Recalibration of the MTC Intraregional Model

prepared for

California High-Speed Rail Authority

prepared by

Cambridge Systematics, Inc.
555 12th Street, Suite 1600
Oakland, CA 94607

March 2010

Table of Contents

List of Tables

List of Tables
(continued)

List of Figures

Introduction

The MTC intraregional model component for the California High-Speed Rail Ridership and Revenue Model (HSR R&R model) was originally developed in 2007. The model was adapted from the Metropolitan Transportation Commission (MTC) Baycast travel model. The intraregional model, while suitable for the first generation HSR R&R model, has proved cumbersome to use and has produced results that, at times, appear to not change consistently with input parameters. A primary cause of these issues seemed to be the off-peak-period transit path skimming procedure used in the original Baycast model and thereby adopted in the first generation HSR R&R model. While the modeling team has been able to address these inconsistencies through off-model adjustments using arc-log elasticities, refinements to the intraregional model were desired to allow more detailed modeling and presentation of results.

Precedence exists for adjustments to the MTC intraregional component of the first generation HSR R&R model. Other recent modeling efforts in the Bay Area have developed their own refinements to the Baycast model to improve consistency of forecasts. One example of such project-specific refinements is modeling undertaken for the Transbay terminal study performed for the Transbay Joint Powers Authority. Model refinements also have been undertaken for transit corridor projects such as AC Transit East Bay Bus Rapid Transit and BART to San Jose.

The MTC completed a revalidation of the Baycast model in late 2004 based on updated demographic, economic, and land use forecasts from the Association of Bay Area Governments' (ABAG) Projections 2003 series[1] and updated 2030 regional forecasts as part of their 2035 transportation plan update.[2] The refinements made to the first generation HSR R&R model, and reported in this technical memorandum, focused on more closely reproducing MTC's updated 2000 and 2030 results while continuing to provide the additional modeling detail required from the HSR R&R model.

[1] *Travel Forecasts for the San Francisco Bay Area 1990-2030 Data Summary*, Planning Section, Metropolitan Transportation Commission, January 2005.

[2] *Transportation 2035 Plan for the San Francisco Bay Area Travel Forecasts – Data Summary*, Planning Section, Metropolitan Transportation Commission, December 2008.

Model Refinements

As noted above, we have determined through several years of hands-on experience that the "best transit path" skimming process employed in MTC's off-peak mode choice model appears to be an important factor influencing some of the inconsistent results that necessitated off-model adjustments. While suitable for MTC's model, results suggested that the very high off-peak service levels for HSR were causing problems for the mode choice model that was calibrated to much lower off-peak service levels for transit. In conjunction with the adjustments made to enhance the transit skimming process, a thorough review of the model implementation code also was performed, and updates were undertaken to ensure more consistent performance of the MTC intraregional component of the HSR R&R model.

Mode choice model calibration targets for 2000 were updated using more recently available data to better reflect peak and off-peak travel. The model was updated to improve the submode choice among transit alternatives, including local bus, express bus, ferry, BART, light rail transit (LRT), commuter rail, and HSR for walk and drive access trips for all times of day. Since the proposed HSR statewide and regional overlay services will serve the Peninsula and the East Bay, particular attention was paid to match travel in Alameda, San Francisco, San Mateo, and Santa Clara counties.

■ Trip Purposes

The MTC model forecasts trips for purposes typically used for urban travel models: home-based work, home-based shop/other, home-based social recreation, home-based school and nonhome-based trips. Home-based school trips are further stratified into grade school, high school, and college purposes. It has been assumed that the home-based school-related trips are not candidates for travel on high-speed rail and these trips were not included in the HSR mode choice models. Therefore, person trips by mode for the school purposes were obtained from MTC along with total person trip tables for future year forecasts.

The HSR R&R model forecasts and summarizes travel for business, commute, recreation, and other travel. Since the MTC model uses the home-based and nonhome-based trip purposes noted above, a mapping of the trip purposes used by the MTC model and the HSR R&R model is required for model application purposes. Table 1 shows the trip purpose interrelationship for model application. All home-based work trips are mapped to commute trips in the HSR model, and all home-based shop/other as well as home-based social/recreational trips are mapped to recreation/other trips. Nonhome-based trips are split between business trip (40 percent) and recreation/other trips (60 percent). Note that the mapping shown in Table 1 is performed after application of the mode choice model.

Auto Vehicle Miles of Travel

While the focus of the HSR R&R model is high-speed rail ridership, forecasting of auto vehicle trips also is important for estimating vehicle miles of travel (VMT). The auto vehicle trips forecast in the MTC intraregional model are added to the vehicle trips estimated from the interregional model for assignment to the statewide roadway network maintained for the HSR R&R model.

Table 1. Correspondence of MTC Intraregional Trip Purposes to HSR R&R Model Trip Purposes

MTC Intraregional Trip Purpose	Percent Assigned to HSR Ridership and Revenue Model Trip Purpose	HSR Ridership and Revenue Model Trip Purpose
Home-Based Work	100%	Commute
Home-Based Shop/Other	100%	Recreation/Other
Home-Based Social/Recreation	100%	Recreation/Other
Nonhome-Based	40%	Business
Nonhome-Based	60%	Recreation/Other

Source: Cambridge Systematics, Inc., 2010.

Auto person trips are modeled by group size (drive alone, two person shared ride, and three or more person shared ride) for the home-based work, home-based shop/other, and home-based social/recreation trip purposes. Auto vehicle trips are estimated by dividing the auto person trips for the group sizes by the corresponding group size. The average group size used for three or more person vehicles is 3.5. This corresponds to the average group size used by MTC in detailed summary spreadsheets for the RVAL2000 and Transportation 2035 Plan.

For nonhome-based travel, the MTC intraregional model forecasts auto person trips for vehicle drivers and vehicle passengers. All nonhome-based model calibration was performed using these two auto submodes. For traffic assignment purposes, the auto vehicle trips are identical to the auto driver trips. However, estimates of the nonhome-based auto person trips by group size are useful for model summaries. The proportions of auto driver trips and auto passenger trips by group size used for summaries of nonhome-based trips are shown in Table 2.

Table 2. Proportions of Nonhome-Based (NHB) Vehicle Driver and Vehicle Passenger Trips by Auto Group Size
Estimates for Selected Summaries

	Trips Assigned to Group Size	
Auto Group Size	**Percent of NHB Vehicle Driver**	**Percent of NHB Vehicle Passenger**
Drive Alone	70%	0%
Shared Ride – 2 Person	20%	67%
Shared Ride – 3+ Person	10%	33%

Source: Cambridge Systematics, Inc., 2010.

Model Scripting

Model implementation scripts were carefully reviewed and updated to ensure that the peak period and off-peak-period models implementing the planned model updates for transit path-building were consistently applied. In addition, the scripts were reviewed to ensure that they properly processed data for scenarios that were not contemplated at the time that the HSR R&R model was originally developed (e.g., varying parking costs for HSR and commuter rail stations). The following subsections identify the scripting issues and modifications.

Transit Path-Building

- Transit path-building parameters were adjusted to ensure consistency for 2000 and 2030 procedures (2000 did not include HSR paths while 2030 paths must account for HSR).

- All walk speeds were set to three miles/hour.

- Factors that control the "spread" of transit paths were modified in the 2000 transit path-building files to reduce the numbers of alternative paths being evaluated. The 2000 files were updated to be consistent with the parameters implemented for the 2030 transit path-building procedures already in place. The 2030 procedures did not have to be changed to implement the transit submode choice model being added to the MTC intraregional model.

- Numbering of input transit skim matrices were carefully reviewed and adjusted to ensure that the correct matrices were being used for the correct purposes and modes considering the different skim matrices being used for 2000 and 2030. For example, the adjustments insured that in-vehicle travel time for HSR was interpreted in the model as in-vehicle time, not walk access time.

Mode Choice Model

- Adjustments were made to ensure that outlier calculation values were processed correctly. For example, the original scripts could incorrectly process natural logs of values close to zero which could cause the model to end with an error. While this occurrence would be quite rare, the adjustment ensured that the scripts would always properly process outlier values.

- All "if-then-else" logic sequences were carefully checked.

- Auto access in-vehicle travel time as a component of total in-vehicle travel time for drive access was checked for consistency with the off-peak period path skimming changes.

- Utility equations were carefully checked to ensure proper processing of household income. For example, the original Baycast model processes household income in dollars for some utility equations and in thousands of dollars in others.

- Processing of location-specific parking costs at commuter rail and high-speed rail stations was adjusted to ensure proper operation for anticipated alternatives testing (not previously analyzed in the first generation HSR R&R model).

Model Calibration

With the scripting refinements in place, the model was recalibrated. The model calibration process included acquisition of year 2000 and 2030 source data from MTC, specification of mode choice target shares, and adjustment of mode choice model constants to reasonably reproduce the target shares.

Year 2000 and 2030 Source Data

Source data for model recalibration, validation, and sensitivity assessment were obtained from recent MTC modeling efforts for 2000 and 2030. MTC has made updates and revalidated the Baycast travel model over the past few years. Since purpose-specific person trip tables for the HSR R&R model are obtained from MTC for both base and future years, updated 2000 person trip tables from the RVAL2000 process were acquired for the model calibration and validation process. Appendix B provides a summary of the residence county to nonresidence county person trips by trip purpose from the updated trip tables. Home-based grade school, home-based high school, and home-based college person trip tables have not been included since mode choice results for those purposes are obtained directly from MTC. It is assumed that home-based school-related trips will not be candidates for travel on high-speed rail.

Updated input files, including person trip tables and socioeconomic data, were obtained from the MTC for 2000 and 2030 from several sources:

- 2000 data were obtained from the MTC forecasting efforts documented in *Travel Forecasts for the San Francisco Bay Area, 1990-2030*. The travel forecasting work for this effort was performed by MTC in 2004 and documented in January 2005. The MTC effort also is referred to as "RVAL2000."

- 2030 data were obtained from the MTC forecasting efforts for *Change in Motion, Transportation 2035 Plan for the San Francisco Bay Area*, December 2008. The travel forecasting work for this effort was performed by MTC in 2007 to 2008.

These 2030 person trip tables will be used for future applications of the MTC intraregional model within the HSR R&R model.

Target and Modeled Mode Shares

Since the revised model included a more refined procedure for forecasting transit submode shares, target mode shares for the model calibration effort had to be reestimated.

Information from MTC's RVAL2000 calibration effort performed in 2004 to 2005 formed the basis for the target mode share estimates. The RVAL2000 data were combined with information from other sources such as the 2000 Bay Area Travel Survey. Table 3 shows the daily mode shares available from RVAL2000 model documentation and supporting files.

The shares shown in Table 3 provided an overall target for the model calibration. However, based on the structure and use of the HSR R&R Model forecasts, additional targets for the model calibration were required. Specifically, the MTC intraregional model forecasts trips by access mode (walk and drive) and transit submode (BART, LRT, commuter rail, local bus, express bus, ferry, and HSR) by time of day. In addition, since HSR, BART, and commuter rail are competing modes on the Peninsula, we considered it important to assess submode shares by county in the calibration process. Table 4 shows the marginal distributions of transit trips by purpose, time of day, and county used to develop targets for the mode choice model calibration.

Appendix A summarizes the target and modeled trips by mode by trip purpose, county, mode, and submode. Model calibration consisted of adjusting mode-specific constants until the modeled mode shares matched observed targets. Model constants were specified in a manner similar to what was used for the original MTC Baycast model with the exception that constants were applied for transit submodes rather than just for total transit. In effect, constants were specified by purpose, (production) county, time of day, and submode. The summary shown in Appendix A does not include the time-of-day stratification although that stratification also was considered in the model calibration.

Table 3. Year 2000 MTC Modeled Mode Shares

	Home-Based						
	Work				Shop	Social	Nonhome-
Mode	Income 1	Income 2	Income 3	Income 4	Other	Recreation	Based
Drive Alone	59.4%	68.0%	72.2%	74.9%	46.7%	34.8%	–
Shared Ride 2	10.6%	10.8%	10.3%	9.6%	25.6%	27.6%	–
Shared Ride 3+	4.0%	4.0%	3.6%	3.1%	14.9%	22.9%	–
Vehicle Driver	–	–	–	–	–	–	68.6%
Vehicle Passenger	–	–	–	–	–	–	15.7%
Transit	15.0%	11.9%	10.4%	9.6%	3.9%	3.0%	2.6%
Bike	2.1%	1.3%	1.0%	0.9%	0.6%	2.9%	0.8%
Walk	8.9%	3.9%	2.5%	1.9%	8.3%	8.9%	12.3%

Source: Table 18, Travel Forecasts for the San Francisco Bay Area 1990-2030, Data Summary, Planning Section, Metropolitan Transportation Commission, January 2005.

Table 4. Additional Year 2000 Mode Choice Target Shares

Marginal	Home-Based						Nonhome-Based
	Work				Shop Other	Social Recreation	
	Income 1	Income 2	Income 3	Income 4			
Time of Day[a]							
Peak	66.0%	66.0%	66.0%	66.0%	32.4%	32.4%	32.4%
Off-Peak	34.0%	34.0%	34.0%	34.0%	67.6%	67.6%	67.6%
County[b]							
San Francisco	14.8%	12.9%	11.7%	12.5%	10.1%	9.9%	15.8%
San Mateo	8.0%	9.9%	10.9%	13.4%	11.3%	13.2%	12.0%
Santa Clara	19.5%	20.8%	24.2%	29.9%	28.2%	29.6%	27.5%
Alameda	24.8%	22.2%	21.1%	17.7%	19.7%	17.1%	19.0%
Rest of Region	33.0%	34.2%	32.1%	26.5%	30.7%	30.2%	25.7%
Submode[c]							
Walk Access-Total	90.8%	85.5%	73.5%	74.6%	96.7%	88.9%	93.6%
BART	30.7%	27.4%	23.0%	23.6%	26.2%	23.3%	25.4%
Commuter Rail	2.1%	2.2%	1.9%	1.9%	2.7%	2.3%	2.1%
LRT	7.2%	7.8%	7.0%	7.0%	10.3%	10.3%	11.3%
Express Bus	9.8%	9.4%	8.1%	8.3%	10.2%	9.0%	9.0%
Local Bus	38.8%	36.9%	31.8%	32.1%	45.6%	42.3%	43.9%
Ferry	2.1%	1.9%	1.7%	1.7%	1.8%	1.7%	1.8%
Drive Access-Total	9.2%	14.5%	26.5%	25.4%	3.3%	11.1%	6.4%
BART	3.3%	5.0%	8.8%	8.3%	1.2%	2.8%	1.8%
Commuter Rail	0.3%	0.7%	1.3%	1.2%	0.2%	0.7%	0.4%
LRT	0.1%	0.2%	0.4%	0.4%	0.1%	0.4%	0.2%
Express Bus	5.3%	8.3%	15.6%	15.1%	1.8%	7.1%	3.9%
Ferry	0.2%	0.3%	0.5%	0.4%	0.0%	0.1%	0.1%

[a] Assumptions built into Baycast travel model source code.

[b] "RVAL2000_validation_summary_TripDistribution.xls" MTC RVAL2000 trip distribution validation. Results from modeled trip tables used since they match input trip tables used for MTC intraregional model.

[c] Cambridge Systematics, Inc., 2010. Submode totals were estimated from various sources in the MTC RVAL2000 documentation, including observed boardings on BART and commuter rail for 2000.

Year 2000 Model Validation

Validation Approach

Since the MTC intraregional model for the HSR R&R model was an adaptation of the implementation of the MTC Baycast model, model validation focused on:

- Demonstrating that the model reasonably reproduced the aggregate results of the MTC model for 2000 and 2030.

- Demonstrating that intraregional trips by mode and transit submode were reasonably reproduced, especially for the geographic areas and modes where HSR competes.

- Demonstrating that the assigned intraregional VMT from the high-speed rail adaptation of the model reasonably reproduced MTC model validation results. The traffic assignment process in the HSR R&R model is somewhat different from the MTC assignment process. Specifically, in the HSR R&R model, intraregional trips for the MTC area are added to interregional trips and the results are assigned to the statewide roadway network using an all-or-nothing assignment process to an estimate of congested roadway speeds. The MTC process uses an equilibrium assignment process for the intraregional trips combined with estimates of those portions of interregional trips occurring in the MTC area.

It should be noted that no specific validation targets such as the reproduction of trips by mode within five percent were established. Emerging practice in model validation is moving away from using strict criteria "proving" that a model is "valid" in favor of a holistic approach that considers the overall reasonableness of all results.

Validation Results

The mode choice model was calibrated to reproduce the estimated target shares shown in Tables 1 through 4 and Appendix A. Table 5 summarizes the results of the RVAL2000 model validation and modeled trips resulting from the application of the MTC intraregional model using the input person trip tables summarized in Appendix B. As would be expected, the modeled results by purpose and mode are all quite close to the RVAL2000 results. These results show, that at an aggregate level, the MTC intraregional model is reasonably reproducing the RVAL2000 model results.

Table 5. Year 2000 Targeted and Modeled Daily Trips by Mode

Mode	Home-Based						Nonhome-Based
	Work				Shop Other	Social Recreation	
	Income 1	Income 2	Income 3	Income 4			
RVAL2000 Results[a]							
Drive Alone	347,281	690,233	1,151,119	1,537,691	2,426,413	858,180	–
Shared Ride 2	62,169	109,290	164,390	196,154	1,331,798	682,040	–
Shared Ride 3+	23,279	41,060	57,484	63,669	776,471	564,597	–
Vehicle Driver	–	–	–	–	–	–	3,993,926
Vehicle Passenger	–	–	–	–	–	–	911,762
Transit	87,732	120,932	165,788	197,704	203,256	74,413	152,854
Bike	12,413	13,203	16,116	18,579	30,957	71,351	48,846
Walk	52,015	40,067	40,037	39,876	432,194	218,612	713,275
MTC Validation Results							
Drive Alone	347,297	690,243	1,151,332	1,537,802	2,427,432	860,880	–
Shared Ride 2	62,166	109,281	164,411	196,177	1,332,084	675,357	–
Shared Ride 3+	23,275	41,056	57,491	63,680	776,747	568,099	–
Vehicle Driver	–	–	–	–	–	–	3,994,826
Vehicle Passenger	–	–	–	–	–	–	911,951
Transit	87,707	120,971	165,635	197,651	201,427	73,817	153,440
Bike	12,406	13,198	16,112	18,578	30,963	71,756	48,851
Walk	52,027	40,023	39,941	39,773	432,440	219,284	711,601
Difference							
Drive Alone	16	10	213	111	1,019	2,700	–
Shared Ride 2	-3	-9	21	23	286	-6,683	–
Shared Ride 3+	-4	-4	7	11	276	3,502	–
Vehicle Driver	–	–	–	–	–	–	900
Vehicle Passenger	–	–	–	–	–	–	189
Transit	-25	39	-153	-53	-1,829	-596	586
Bike	-7	-5	-4	-1	6	405	5
Walk	12	-44	-96	-103	246	672	-1,674
Percent Difference							
Drive Alone	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	–
Shared Ride 2	0.0%	0.0%	0.0%	0.0%	0.0%	-1.0%	–
Shared Ride 3+	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	–
Vehicle Driver	–	–	–	–	–	–	0.0%
Vehicle Passenger	–	–	–	–	–	–	0.0%
Transit	0.0%	0.0%	-0.1%	0.0%	-0.9%	-0.8%	0.4%
Bike	-0.1%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%
Walk	0.0%	-0.1%	-0.2%	-0.3%	0.1%	0.3%	-0.2%

Source: Cambridge Systematics, Inc., 2010.

[a] Table 4.25, 2000 Base Year Validation of Travel Demand Models for the San Francisco Bay Area (BAYCAST-90) – Technical Summary, Planning Section, Metropolitan Transportation Commission, May 2004.

Table 6 provides a comparison of the modeled total trips by submode to the target trips by submode. The data in Table 6 have been summarized from the information contained in

Appendix A. In, and of itself, Table 6 is not truly a validation since the submode trips were used for the model calibration. The target data were not observed; rather they were estimated from multiple sources. However, some independent data do exist that can be used for validation purposes. Specifically, BART boardings for the region for 2000 totaled 324,000 on an average day (based on counts performed by BART) and Caltrain boardings totaled 27,300.[3] Since BART transfers take place "within" the system and there is little reason to transfer between Caltrain trains, the reported boardings can be equated to transit trips for each of the modes.

Table 6. Year 2000 Daily Trips by Submode

	San Francisco	San Mateo	Santa Clara	Alameda	Rest of Region	Total Region
Target						
BART	135,341	12,823	2,404	97,563	52,797	300,929
Commuter Rail	5,590	8,811	12,044	1,919	532	28,896
LRT	77,768	0	11,356	0	0	89,124
Bus	218,084	48,233	93,943	111,481	89,015	560,755
Ferry	11,611	0	0	3,877	4,976	20,464
Transit	448,394	69,867	119,747	214,840	147,320	1,000,168
Modeled						
BART	136,521	12,841	2,059	97,516	52,773	301,709
Commuter Rail	5,603	8,594	11,969	1,931	533	28,630
LRT	77,894	9	11,459	9	10	89,381
Bus	218,554	48,234	93,345	111,597	88,964	560,694
Ferry	11,609	0	0	3,594	4,916	20,120
Transit	450,181	69,678	118,832	214,646	147,196	1,000,533
Difference						
BART	1,180	18	-345	-47	-24	780
Commuter Rail	13	-217	-75	12	1	-266
LRT	126	9	103	9	10	257
Bus	470	1	-598	116	-51	-61
Ferry	-2	0	0	-283	-60	-344
Transit	1,787	-189	-915	-194	-124	365
Percent Difference						
BART	0.9%	0.1%	-14.4%	0.0%	0.0%	0.3%
Commuter Rail	0.2%	-2.5%	-0.6%	0.6%	0.2%	-0.9%
LRT	0.2%	–	0.9%	–	–	0.3%
Bus	0.2%	0.0%	-0.6%	0.1%	-0.1%	0.0%
Ferry	0.0%	–	–	-7.3%	-1.2%	-1.7%
Transit	0.4%	-0.3%	-0.8%	-0.1%	-0.1%	0.0%

Source: Cambridge Systematics, Inc., 2010.

[3] Table 21, Travel Forecasts for the San Francisco Bay Area 1990-2030 – Data Summary, Planning Section Metropolitan Transportation Commission, January 2005.

As shown in Table 6, modeled trips on BART totaled 301,700. Since BART serves numerous home-based school trips and trips made by nonresidents of the region, the home-based work, home-based shop-other, home-based social-recreation, and nonhome-based trips on BART should be less than the 324,000. While the total number of home-based school trips on BART is unknown, the 22,300 trips implied by the difference represents a 1.0 percent BART mode share of school trips. In comparison, the 301,700 BART trips for home-based work, home-based shop-other, home-based social-recreation, and nonhome-based trips represent a BART mode share of 1.6 percent.

Modeled commuter rail totaled 28,600 versus observed Caltrain boardings of 27,300. According to information summarized in Table 6.13 of the 2000 Base Year Validation of Travel Demand Models for the San Francisco Bay Area (BAYCAST-90) – Technical Summary, the Altamont Commuter Express (ACE) reported 1,743 average daily boardings in 2000 and Amtrak reported 1,015 average daily boardings for the *Capitol Corridor* and *San Joaquins* routes. Since a portion of the 2,758 boardings on those two systems occur outside of the MTC region, the 1,300 difference between total commuter rail boardings and Caltrain boardings seems reasonable. Table 7 summarizes the assigned daily VMT from the revised MTC model compared to the assigned regional VMT from the 2000 regional model validation performed by MTC. VMT accruing from home-based grade school, home-based high school, home-based college, truck, and interregional travel is included in Table 7; VMT from intrazonal travel is included in the VMT. The home-based grade school, home-based high school, home-based college, truck vehicle trip tables for both assignments are from the RVAL2000 model validation. The interregional travel for the RVAL2000 is based on procedures employed by MTC while the interregional travel for the HSR R&R model with the revised MTC intraregional model is from the interregional model component.

Table 7. RVAL2000 and Revised MTC Intraregional Model VMT for 2000 by County

County	RVAL2000 VMT[a]	Modeled VMT[b]	Difference	Percent Difference
Alameda	30,147,000	32,885,000	2,738,000	9%
Contra Costa	17,653,000	18,695,000	1,042,000	6%
San Francisco	7,674,000	8,450,000	776,000	10%
San Mateo	15,684,000	16,757,000	1,073,000	7%
Santa Clara	34,584,000	35,956,000	1,372,000	4%
Total	**105,742,000**	**112,743,000**	**7,001,000**	**7%**

Source: Cambridge Systematics, Inc., 2010.

[a] Summarized from Table 7.9 from *2000 Base Year Validation of Travel Demand Models for the San Francisco Bay Area (BAYCAST-90) – Technical Summary*, prepared by Planning Section of the Metropolitan Transportation Commission, May 2004. Includes intraregional VMT from home-based work, home-based shop/other, home-based social/recreation, home-based school,

nonhome-based, truck, and interregional trips. The MTC summaries are silent regarding the inclusion or exclusion of centroid connector VMT. The MTC summaries exclude estimated VMT from intrazonal trips.

[b] Includes VMT accruing from assignment of intraregional and interregional trips forecast using the HSR R&R model with revised MTC intraregional model. Vehicle trips for home-based grade school, home-based high school, home-based college, and truck trips obtained from 2000 Base Year Validation forecasts prepared by MTC. The modeled VMT includes VMT on centroid connector links and excludes estimated VMT from intrazonal trips.

As can be seen in Table 7, the HSR R&R model with the updated MTC intraregional model component slightly overestimates total VMT for each of the five counties summarized. Since the mode shares by trip purpose match RVAL2000 targets at an aggregate level and the input person trip tables are the RVAL2000 person trip tables, the differences in VMT have to be attributed to the network differences and differences between assignment procedures as well as intrazonal VMT. According to RVAL2000 technical documentation, the MTC traffic assignment process is as follows:

> *The daily assignment methodology assigns trips on an all-or-nothing basis to either a.m. peak-period, congested time paths or to off-peak, free-flow time paths. In daily assignments, only HOVs are assigned to HOV lanes, and trucks are prohibited from being assigned to trucks-prohibited facilities (i.e., I-580, Cal-85). Daily trips are split into peak-period trips, representing the three-hour a.m. peak period plus the three-hour p.m. peak period, and the balance of day (18 hours) trips.*[4]

The HSR R&R model with the updated MTC intraregional model component also used all-or-nothing assignments based on estimates of congested peak and off-peak period speeds. Since the HSR R&R model includes a roadway network for the entire state, estimated congested speeds were developed based on a full traffic assignment performed as part of the original model development. The estimated congested speeds are consistent with the statewide auto travel time skims used for the CAHSR interregional model.

Table 8 summarizes peak-period speeds by county and facility type based on modeled peak-period VMT and vehicle hours of travel (VHT) for the RVAL2000 model and the HSR R&R model. The average speeds vary somewhat since they are based on different sources for the assignment and based on different assignment results. Nevertheless, the two sets of speeds show a high degree of similarity. Given all of the above factors, it is our conclusion that the HSR R&R model with the updated MTC intraregional model produces reasonable VMT forecasts.

[4] *2000 Base Year Validation of Travel Demand Models for the San Francisco Bay Area (BAYCAST-90) – Technical Summary*, Planning Section, Metropolitan Transportation Commission, May 2004.

Table 8. RVAL2000 and Revised MTC Intraregional Model Peak-Period Speeds for 2000

	County of Occurrence								
Facility Type	**Alameda**	**Contra Costa**	**Marin**	**Napa**	**San Francisco**	**San Mateo**	**Santa Clara**	**Solano**	**Sonoma**
RVAL2000 Peak-Period Average Speeds in MPH (VMT/VHT)									
Freeway and Frwy-to-Frwy	45.7	48.4	52.2	62.3	42.6	46.5	40.3	52.4	46.3
Expressway	29.9	34.1	–	36.8	27.4	30.9	28.3	31.0	33.3
Collector	20.5	22.8	23.3	25.2	15.4	18.3	20.0	21.1	23.9
Freeway Ramp	30.2	28.0	29.2	33.0	24.6	27.8	23.6	32.4	23.8
Major Arterial	24.1	27.8	26.8	27.7	18.9	24.4	23.1	28.7	27.0
HSR R&R Model MTC Intraregional Model Peak-Period Average Speeds in MPH (VMT/VHT)									
Freeway and Frwy-to-Frwy	47.0	48.5	46.5	61.8	39.8	48.0	49.4	59.3	52.6
Expressway	37.4	39.1	–	31.8	27.4	29.4	33.9	32.6	32.5
Collector	22.2	23.8	24.0	27.9	19.5	21.9	22.2	23.2	25.6
Freeway Ramp	29.3	29.2	26.4	32.7	25.3	28.3	28.3	32.6	31.4
Major Arterial	26.2	28.3	26.2	30.4	21.9	27.1	26.7	30.5	29.6

Source: Cambridge Systematics, Inc., 2010.

Table 9 summarizes the transit flows along the Peninsula corridor from RVAL2000 and the MTC intraregional model. Overall, the modeled transit flows along the Peninsula match the flows MTC obtained with the RVAL2000 model validation. However, more variation can be noted by trip purpose.

Table 9. RVAL2000 and Revised MTC Intraregional Model Transit Flows for 2000 in Peninsula Corridor[a]

Trip Purpose	RVAL2000	Model	Difference	Percent Difference
HBW	111,957	109,497	-2,460	-2.2%
HBSH	42,451	40,194	-2,257	-5.3%
HBSR	16,993	15,686	-1,307	-7.7%
NHB	27,761	29,962	2,201	7.9%
Total	**199,162**	**195,339**	**-3,823**	**-1.9%**

Source: Cambridge Systematics, Inc., 2010.

[a] Includes all transit trips between the following counties: San Francisco and San Mateo, San Francisco and Santa Clara, San Mateo and San Francisco, San Mateo and San Mateo, San Mateo and Santa Clara, Santa Clara and San Francisco, Santa Clara and San Mateo, and Santa Clara and Santa Clara.

Year 2030 Model Reasonableness Tests

The revised travel model was applied for the following 2030 scenarios:

- No Project;
- May 2009 Operating Plan Scenario – Full System;
- May 2009 Operating Plan Scenario – Phase 1; and
- Increased Station Parking Cost Scenario – Full System.

The May 2009 operating plan represents the current HSR assumptions for regional environmental and engineering analysis. Table 10 shows the numbers of trains per hour serving each of the five stations in the MTC region, provided the trains make at least one other stop within the MTC region. Table 11 shows the assumed HSR parking costs in 2005 dollars.

The 2030 input person trip tables were obtained from the most current MTC travel forecasts performed for the 2035 regional transportation plan (based on the ABAG 2007 land use forecasts). Appendix C summarizes the 2030 county-to-county trips by trip purpose used for all 2030 model runs.

The 2030 model runs provide information regarding the sensitivity of the revised intraregional travel model. Table 12 summarizes the annual trips and shares by mode. The results for the four forecasts performed using the MTC intraregional model component of the HSR R&R model show reasonable sensitivities in comparison to each other.

Table 10. High-Speed Trains per Hours Stopping at MTC Region Stations[a]

	Full System		Phase 1	
Station	**Peak**	**Off-Peak**	**Peak**	**Off-Peak**
San Francisco Transbay Terminal	9	7	7	7
Millbrae	4	4	4	4
Redwood City	8	7	4	7
San Jose	9	7	7	7
Gilroy	7	7	3.5	7

Source: Cambridge Systematics, Inc., 2010.

[a] Trains must make at least one stop at another station in the MTC region to be included in the count.

Table 11. Parking Costs per Trip at HSR Stations
2005 Dollars

Station	May 2009 Operating Plan Scenario	Increased Parking Cost Scenario
San Francisco Transbay Terminal	$25	$36
Millbrae	$3	$16
Redwood City	$3	$16
San Jose	$3	$21
Gilroy	$3	$11

Source: Cambridge Systematics, Inc., 2010.

Forecasts produced by MTC using the Baycast model for the 2030 base case (i.e., no high-speed rail) are also shown in Table 12. As can be seen, the MTC intraregional model forecasts slightly more transit and nonmotorized trips for the 2030 No Project alternative than were forecast using the Baycast model for the 2030 MTC Base Case.

Table 13 shows the source of annual ridership for the three 2030 HSR scenarios in comparison to a 2030 scenario without HSR (i.e., "No Project"). Approximately one-half of the high-speed rail business and commute ridership is diverted from auto and about 35 percent is diverted from conventional rail. Less than 5 percent of the business and commute ridership is diverted from bus, LRT, ferry or nonmotorized modes. In contrast, approximately 90 percent of the recreation and other ridership on HSR is diverted from auto with the remaining portion being diverted from conventional rail. Overall, 70 to 73 percent of the trips diverted to HSR are business and commute trips.

Table 12. 2030 Annual MTC Intraregional Trips in Millions and Mode Shares

	Annual Intraregional Trips in Millions					Mode Shares			
Alternative	Conventional Rail[a]	HSR	Other[b]	Auto[c]	Total	Conventional Rail[a]	HSR	Other[b]	Auto
2030 MTC Base Case[d]		0.0	1,376.9[e]	6,720.4	8,097.3		0.00%	17.0%	83.0%
2030 No Project	156.1	0.0	1,267.6	6,673.4	8,097.1	1.9%	0.00%	15.7%	82.4%
May 2009 Operating Plan – Full System	153.8	8.1	1,266.6	6,668.6	8,097.1	1.9%	0.10%	15.6%	82.4%
May 2009 Operating Plan – Phase 1	153.8	8.0	1,266.6	6,668.7	8,097.1	1.9%	0.10%	15.6%	82.4%
Increased Parking Cost Scenario – Full System	154.3	6.5	1,266.8	6,669.6	8,097.1	1.9%	0.08%	15.6%	82.4%

Source: Cambridge Systematics, Inc., 2010.

[a] Conventional rail includes BART, Caltrain, ACE, and Capitol Corridor trains.

[b] Includes trips on bus, LRT, and ferry and trips on nonmotorized modes.

[c] Does not include home-based grade school, home-based high school, home-based college, and truck trips and model results are presented with NHB auto trips being the sum of driver and passenger trips (not applying auto group size and occupancy rates). Adding in school trips and applying auto group size and occupancy rates, the following annual intraregional auto person trips by scenario are: 7,553.2 million for 2030 No Project, 7,547.8 million for May 2009 Operating Plan; and 7,549.0 million for the Increased Parking Cost Scenario.

[d] Source: Estimated from detailed data summaries contained in Table E.6, *Transportation 2035 Plan For the San Francisco Bay Area, Travel Forecasts – Data Summary*, prepared by the Planning Section of the Metropolitan Transportation Commission, December 2008. A 261 annualization factor was used for Business/Commute and 365 was used for Recreation/Other. Business/Commute estimated as home-based work plus 40 percent of nonhome-based trips as per Table 1 of this report.

[e] Include trips both conventional rail and other modes (bus, LRT, ferry, and nonmotorized).

Table 13. Source of 2030 HSR Ridership – Annual Trips

In Comparison to No Project

	Conventional Rail[a]		Other[b]		Auto		Total		
	Business/ Commute	Recreation/ Other	Business/ Commute	Recreation/ Other	Business/ Commute	Recreation/ Other	Business/ Commute	Recreation/ Other	Total
Source of HSR Trips (in Millions)									
May 2009 Operating Plan – Full System	2.1	0.2	0.9	0.0	2.9	2.0	5.9	2.2	8.1
May 2009 Operating Plan – Phase 1	2.1	0.2	0.9	0.0	2.8	1.9	5.8	2.2	8.0
Increased Parking Cost Scenario – Full System	1.7	0.1	0.7	0.0	2.1	1.7	4.5	1.9	6.4
Source of HSR Trips (in Percent)									
May 2009 Operating Plan – Full System	26%	2%	12%	0%	36%	24%	73%	27%	
May 2009 Operating Plan – Phase 1	26%	2%	12%	0%	35%	24%	73%	27%	
Increased Parking Cost Scenario – Full System	26%	2%	11%	1%	33%	27%	70%	30%	

Source: Cambridge Systematics, Inc., 2010.

[a] Conventional rail includes BART, Caltrain, ACE, and Capitol Corridor trains.

[b] Includes trips on bus, LRT, and ferry and trips on nonmotorized modes.

Table 14 summarizes the boardings by station for each of the alternatives and Table 15 summarizes the segment volumes. The results of the May 2009 Operating Plan scenarios are as expected since there is relatively little change in peak service at the stations and no change in off-peak service. The change in ridership between the two Full System scenarios also are reasonable. The business/commute trips are relatively more sensitive to the increases in parking cost (decreasing by about 25 percent) than the recreation/other trips (decreasing by about 10 percent). This model outcome is logical since the business/commute trips would typically be made on a more regular basis than the recreation/other trips. In addition, intraregional business/commute trips are typically full day trips accruing the maximum parking charge while intraregional recreation/other trips are typically shorter duration trips that accrue less than full day parking charges.

Tables 16 through 18 summarize the daily 2030 station-to-station movements for the three high-speed rail scenarios. The station movements have been converted to "origin-destination" format prior to assignment and, thus, are symmetrical.

Table 14. 2030 Daily Station Boardings

	May 2009 Operating Plan				Increased Parking Cost Scenario	
	Full System		Phase 1		Full System	
Station	Business/ Commute	Recreation/ Other	Business/ Commute	Recreation/ Other	Business/ Commute	Recreation/ Other
San Francisco Transbay Terminal	10,500	2,800	10,400	2,800	8,100	2,500
Millbrae	4,900	900	4,900	900	3,500	700
Redwood City	2,900	900	2,800	900	2,200	800
San Jose	3,300	1,200	3,300	1,200	2,600	1,100
Gilroy	1,000	100	1,000	100	900	100
Total	**22,500**	**5,900**	**22,300**	**5,900**	**17,200**	**5,300**

Source: Cambridge Systematics, Inc., 2010.

Table 15. 2030 Daily Segment Volumes

		May 2009 Operating Plan		Increased Parking Cost Scenario
From	To	Full System	Phase 1	Full System
San Francisco	Millbrae	13,300	13,200	10,600
Millbrae	Redwood City	8,400	8,300	7,000
Redwood City	San Jose	5,300	5,300	4,500
San Jose	Gilroy	1,100	1,100	1,000

Source: Cambridge Systematics, Inc., 2010.

Table 16. 2030 Daily Station-to-Station Movements for May 2009 Operating Plan

Full System

From/To	San Francisco	Millbrae	Redwood City	San Jose	Gilroy
San Francisco		5,300	3,200	3,900	900
Millbrae	5,300		300	200	0
Redwood City	3,200	300		300	0
San Jose	3,900	200	300		200
Gilroy	900	0	0	200	

Source: Cambridge Systematics, Inc., 2010.

Table 17. 2030 Daily Station-to-Station Movements for May 2009 Operating Plan

Phase 1

From/To	San Francisco	Millbrae	Redwood City	San Jose	Gilroy
San Francisco		5,300	3,100	3,900	900
Millbrae	5,300		300	200	0
Redwood City	3,100	300		300	0
San Jose	3,900	200	300		100
Gilroy	900	0	0	100	

Source: Cambridge Systematics, Inc., 2010.

Table 18. 2030 Daily Station-to-Station Movements for Increased Parking Cost Scenario

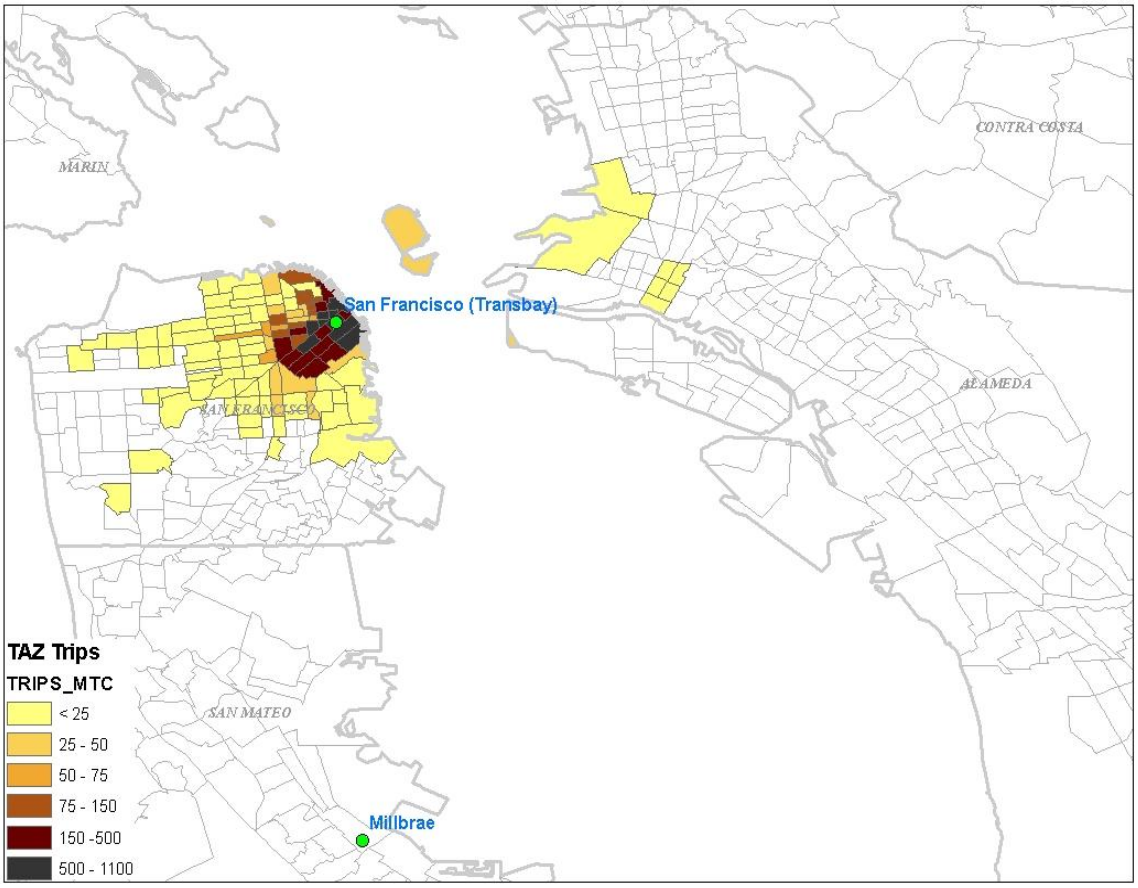
Full System

From/To	San Francisco	Millbrae	Redwood City	San Jose	Gilroy
San Francisco		3,900	2,600	3,300	800
Millbrae	3,900		200	100	0
Redwood City	2,600	200		200	0
San Jose	3,300	100	200		100
Gilroy	800	0	0	100	

Source: Cambridge Systematics, Inc., 2010.

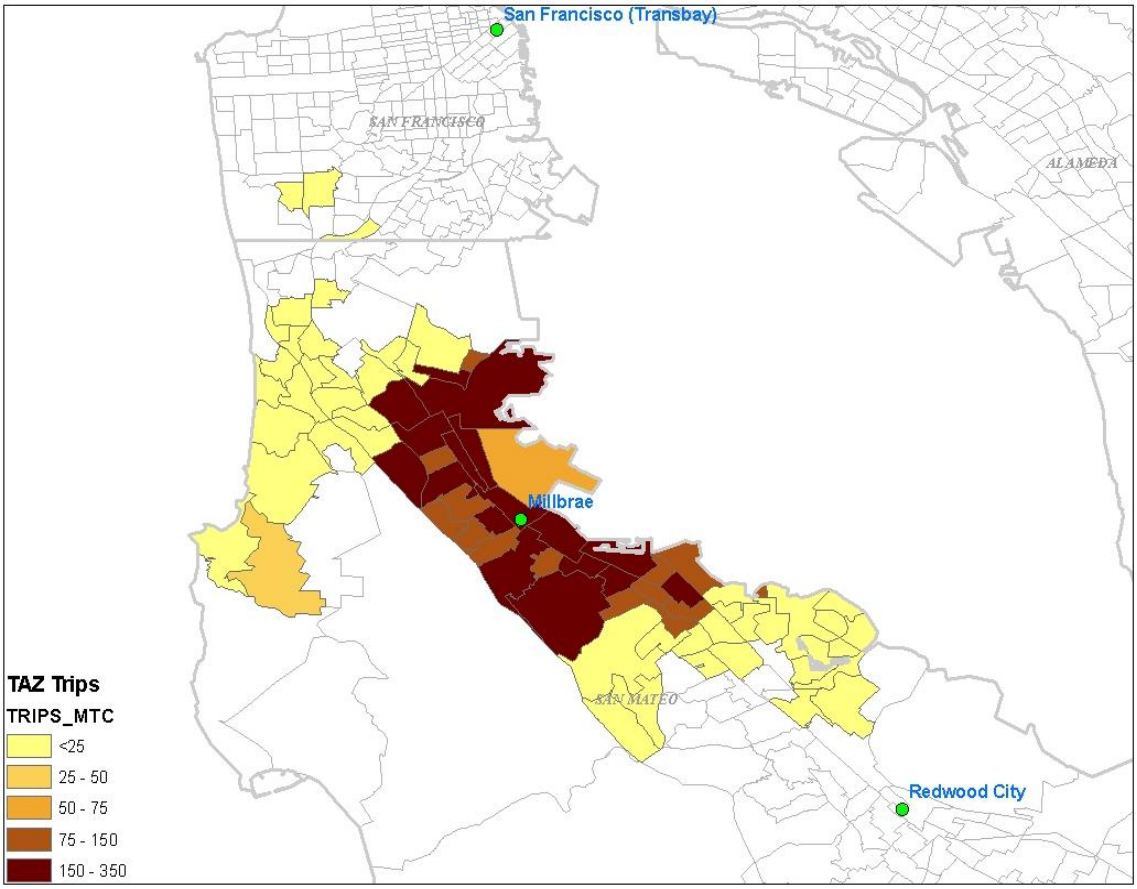
Figures 1 through 5 illustrate the HSR station access/egress patterns for intraregional travel under the May 2009 Operating Plan – Full System scenario. Each shaded TAZ has at least one HSR trip accessing a station. Interestingly, HSR serves very few intraregional trips that do not begin and end on the Peninsula. The access/egress patterns are quite logical, with the highest number of trips occurring in close proximity to each station, with the gradient decreasing quite rapidly as distance from the station increases.

Figure 1. HSR Intraregional Trips Accessing Transbay Terminal Station
May 2009 Operating Plan – Full System



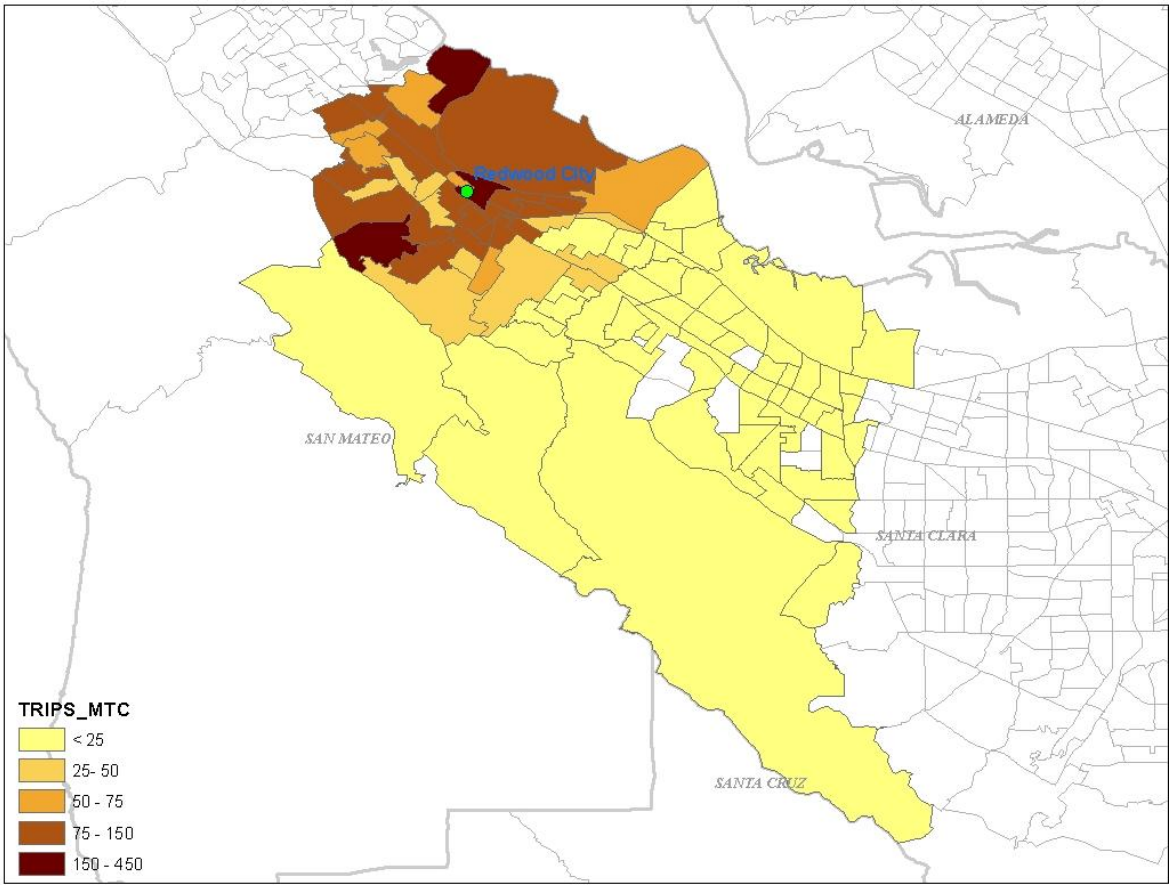
Source: Cambridge Systematics, Inc., 2010.

Figure 2. HSR Intraregional Trips Accessing Millbrae Station
May 2009 Operating Plan – Full System



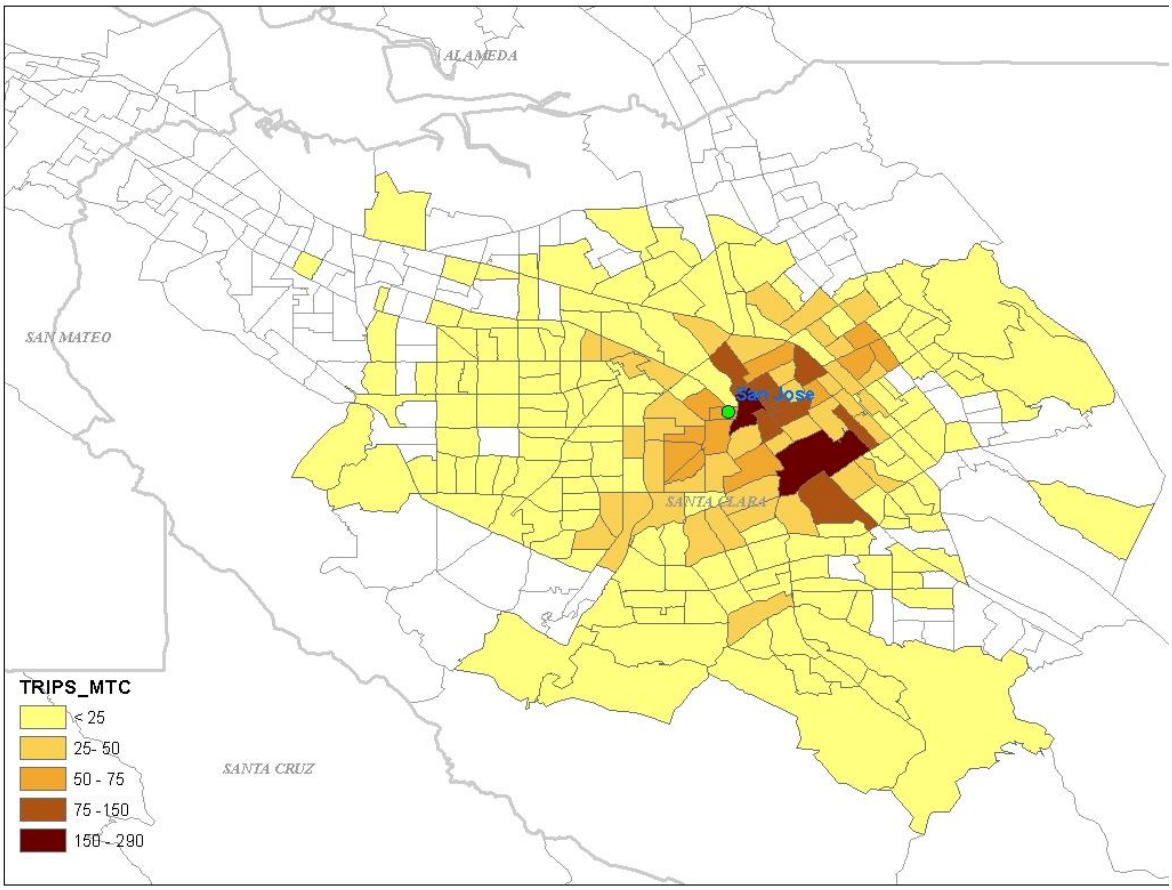
Source: Cambridge Systematics, Inc., 2010.

Figure 3. HSR Intraregional Trips Accessing Redwood City Station
May 2009 Operating Plan – Full System



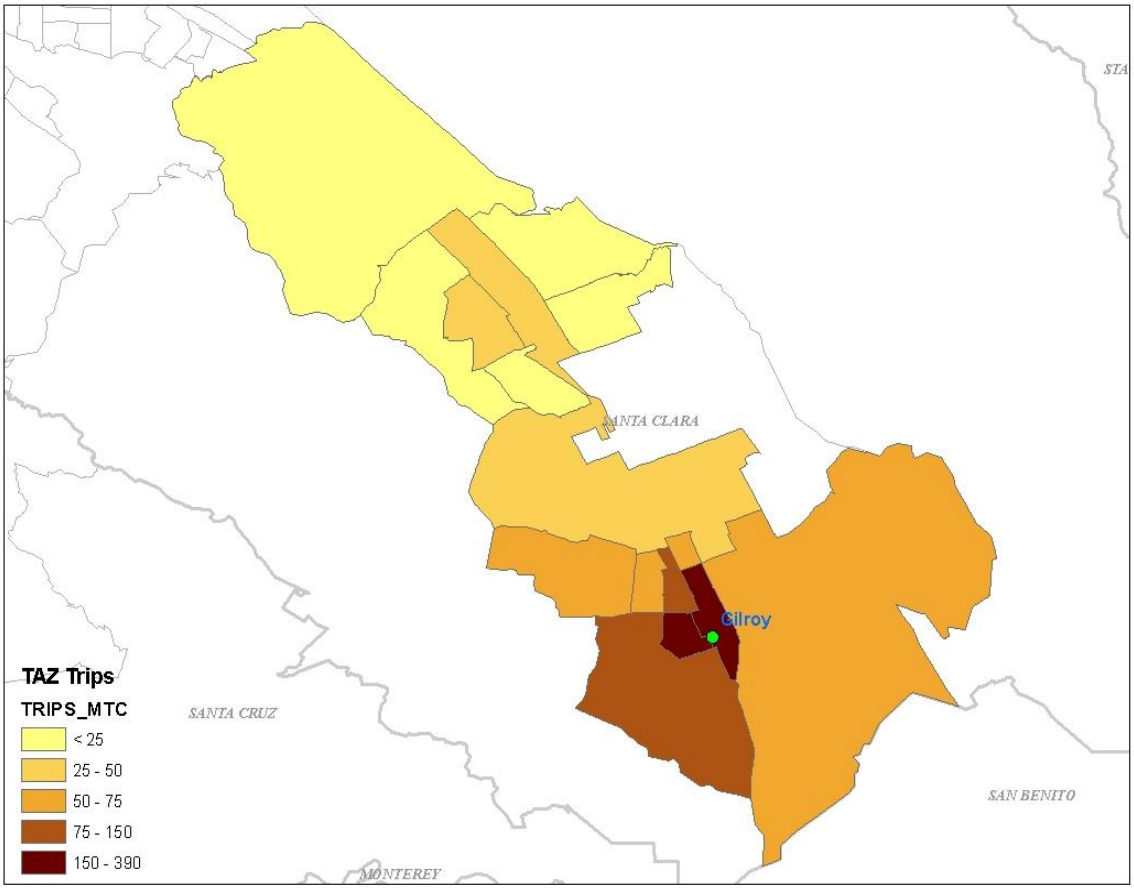
Source: Cambridge Systematics, Inc., 2010.

Figure 4. HSR Intraregional Trips Accessing San Jose Station
May 2009 Operating Plan – Full System



Source: Cambridge Systematics, Inc., 2010.

Figure 5. HSR Intraregional Trips Accessing Gilroy Station
May 2009 Operating Plan – Full System



Source: Cambridge Systematics, Inc., 2010.

Table 19 compares VMT by county for "observed" and modeled conditions. The "observed" VMT is drawn from a 2030 forecast conducted by MTC during preparation of the MTC's 2035 Transportation Plan, while modeled VMT represents the 2030 VMT forecast using the HSR R&R model with the revised MTC intraregional model component. The data summarized in Table 19 are comparable to the data summarized in Table 7 for the year 2000 model validation. While the differences between forecast VMT by county have shifted somewhat, the overall percent differences for the five core counties are the same; the HSR R&R model forecast is seven percent higher than the MTC forecast, for both 2000 and 2030.

Table 20 summarizes the 2030 forecast intraregional VMT by county for the no-build and five high-speed rail scenarios. Results in the table illustrate stability in the VMT forecasting process, and there are reasonable patterns of VMT changes considering characteristics of each HSR scenario. Specifically, the largest relative decreases in VMT in comparison to the no-build alternative accrue in the counties most affected by the high-speed rail: San Mateo and Santa Clara counties.

Table 19. Year 2030 MTC (Baycast Model) and Revised MTC Intraregional Model (HSR R&R Model) VMT Forecasts

County	MTC 2030 VMT[a] (Baycast Model)	Modeled VMT[b] (HSR R&R Model)	Difference	Percent Difference
Alameda	42,732,000	42,914,000	182,000	0%
Contra Costa	24,671,000	27,060,000	2,389,000	10%
San Francisco	9,004,000	10,251,000	1,247,000	14%
San Mateo	20,722,000	23,516,000	2,794,000	13%
Santa Clara	46,289,000	49,388,000	3,099,000	7%
Total	**143,418,000**	**153,129,000**	**9,711,000**	**7%**

Source: Cambridge Systematics, Inc., 2010.

[a] Summarized from Table F.5, *Transportation 2035 Plan For the San Francisco Bay Area, Travel Forecasts – Data Summary*, prepared by the Planning Section of the Metropolitan Transportation Commission, December 2008. Includes intraregional VMT from home-based work, home-based shop/other, home-based social/recreation, home-based school, nonhome-based, truck, and interregional trips. The MTC summaries are silent regarding the inclusion or exclusion of centroid connector VMT. The MTC summaries exclude estimated VMT from intrazonal trips.

[b] Includes VMT accruing from assignment of intraregional and interregional trips forecast using the HSR R&R model with revised MTC intraregional model. Vehicle trips for home-based grade school, home-based high school, home-based college, and truck trips were obtained from 2030 MTC forecasts prepared for the 2035 Transportation Plan. The modeled VMT includes VMT on centroid connector links and excludes estimated VMT from intrazonal trips.

Table 20. Year 2030 HSR R&R Model Daily Intraregional VMT by County[a]

		May 2009 Operating Plan		Increased Parking Cost Scenario		Dual San Francisco Termini Scenario
County	**No HSR**	**Full**	**Phase 1**	**Full**	**Phase 1**	**Phase 1**
Alameda	42,914,000	42,289,000	42,477,000	42,301,000	42,484,000	42,497,000
Contra Costa	27,060,000	26,865,000	26,901,000	26,867,000	26,903,000	26,913,000
San Francisco	10,251,000	10,112,000	10,121,000	10,131,000	10,140,000	10,131,000
San Mateo	23,516,000	23,114,000	23,136,000	23,162,000	23,183,000	23,145,000
Santa Clara	49,388,000	48,507,000	48,615,000	48,538,000	48,643,000	48,656,000
Total	**153,129,000**	**150,887,000**	**151,250,000**	**150,999,000**	**151,353,000**	**151,342,000**

Source: Cambridge Systematics, Inc., 2010.

[a] Includes VMT accruing from assignment of intraregional and interregional trips forecast using the CAHSR model with revised MTC intraregional model. Vehicle trips for home-based grade school, home-based high school, home-based college and trucks obtained from 2030 MTC forecasts prepared for the 2035 Transportation Plan. The modeled VMT includes VMT on centroid connector links and excludes estimated VMT from intrazonal trips.

Conclusions

This report documents efforts to refine the MTC intraregional model component of the first generation HSR R&R model. The refinements included model script revisions, modifications to the transit path skimming used in the off-peak mode choice model, recalibration of the model constants, and an extensive validation process. Results from this effort indicate that the refined model accurately replicates observed data for year 2000 conditions as well as baseline year 2030 forecasts previously produced by MTC. Reasonable validation results were observed across a wide range of metrics for year 2000 and 2030, including county-level totals by trip purpose and main mode, county-to-county flows by transit submode within the Peninsula, VMT totals, HSR ridership changes between scenarios, and HSR station access/egress patterns. Based on these results, the modeling team concludes that calibration and validation of the MTC intraregional model has been completed, and recommends that this refined intraregional model be incorporated within the HSR R&R model for testing of future scenarios.

Appendix A

2000 Target and Modeled Trips by Purpose, County, Mode, and Submode

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode

	Target						Modeled					
Home-Based Work	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Income Quartile 1												
Drive Alone	25,807	30,940	79,790	79,795	130,948	347,279	25,777	30,949	79,789	79,828	130,954	347,297
Shared Ride 2	4,804	5,490	12,700	15,280	23,895	62,169	4,796	5,493	12,700	15,283	23,894	62,166
Shared Ride 3+	2,266	1,739	3,723	6,687	8,864	23,279	2,262	1,740	3,723	6,687	8,863	23,275
Transit	31,979	4,862	7,485	26,930	16,475	87,732	31,957	4,873	7,482	26,903	16,468	87,682
Bike	2,508	555	3,627	3,236	2,488	12,413	2,499	554	3,626	3,238	2,488	12,406
Walk	18,930	3,035	6,670	13,259	10,120	52,015	18,998	3,011	6,664	13,232	10,122	52,027
Total	**86,294**	**46,621**	**113,994**	**145,187**	**192,790**	**584,886**	**86,289**	**46,620**	**113,984**	**145,172**	**192,790**	**584,854**
Transit Walk Access	31,783	4,175	6,427	23,123	14,146	79,654	31,708	4,211	6,489	22,966	14,108	79,482
Walk Access Bart	9,938	789	140	10,884	5,199	26,950	9,907	797	142	10,790	5,184	26,820
Walk Access Commuter Rail	354	539	692	212	52	1,848	354	546	701	210	52	1,863
Walk Access LRT	5,708	0	647	0	0	6,355	5,695	0	653	0	0	6,349
Walk Access Express Bus	2,370	1,106	1,030	2,394	1,739	8,640	2,366	1,112	1,041	2,373	1,730	8,621
Walk Access Local Bus	12,523	1,741	3,917	9,191	6,659	34,031	12,488	1,756	3,952	9,154	6,646	33,996
Walk Access Ferry	890	0	0	442	496	1,829	898	0	0	439	496	1,833
Transit Drive Access	196	687	1,058	3,807	2,329	8,078	249	662	993	3,936	2,360	8,200
Drive Access BART	139	125	22	1,743	829	2,859	177	120	21	1,825	843	2,985
Drive Access Commuter Rail	57	86	110	34	8	296	70	83	102	37	9	300
Drive Access LRT	0	0	103	0	0	103	0	0	95	0	0	95
Drive Access Express Bus	0	476	823	1,960	1,414	4,672	2	459	775	2,027	1,429	4,692
Drive Access Ferry	0	0	0	70	78	147	0	0	0	48	80	127

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
Home-Based Work	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Income Quartile 2												
Drive Alone	49,877	71,761	160,971	149,968	257,661	690,238	49,885	71,755	160,968	149,974	257,661	690,243
Shared Ride 2	10,461	10,308	23,388	25,040	40,094	109,291	10,454	10,308	23,387	25,040	40,093	109,281
Shared Ride 3+	3,531	3,626	6,854	10,548	16,502	41,060	3,528	3,626	6,853	10,548	16,501	41,056
Transit	47,655	9,722	11,335	29,386	22,834	120,933	47,701	9,723	11,332	29,363	22,826	120,944
Bike	3,035	1,143	3,862	3,188	1,976	13,203	3,029	1,143	3,862	3,188	1,976	13,198
Walk	16,392	3,543	5,100	7,135	7,897	40,067	16,348	3,543	5,100	7,135	7,897	40,023
Total	**130,950**	**100,104**	**211,510**	**225,265**	**346,964**	**1,014,793**	**130,945**	**100,096**	**211,502**	**225,248**	**346,954**	**1,014,745**
Transit Walk Access	47,155	7,463	8,701	22,557	17,528	103,403	47,021	7,462	8,671	22,508	17,501	103,163
Walk Access Bart	14,661	1,393	187	10,517	6,371	33,130	14,581	1,393	186	10,486	6,360	33,006
Walk Access Commuter Rail	468	954	926	205	64	2,617	466	953	922	205	64	2,610
Walk Access LRT	8,506	0	867	0	0	9,373	8,490	3	864	1	1	9,358
Walk Access Express Bus	3,460	1,976	1,389	2,340	2,155	11,319	3,464	1,974	1,384	2,334	2,150	11,307
Walk Access Local Bus	18,733	3,140	5,332	9,070	8,332	44,608	18,678	3,139	5,315	9,058	8,322	44,512
Walk Access Ferry	1,327	0	0	425	605	2,356	1,342	0	0	424	604	2,370
Transit Drive Access	500	2,259	2,634	6,829	5,307	17,529	680	2,260	2,661	6,855	5,325	17,781
Drive Access BART	356	435	59	3,262	1,984	6,095	488	435	59	3,290	1,993	6,266
Drive Access Commuter Rail	144	296	289	63	20	812	185	296	293	64	20	858
Drive Access LRT	0	0	270	0	0	270	0	0	273	0	0	274
Drive Access Express Bus	0	1,529	2,017	3,370	3,112	10,029	6	1,529	2,036	3,391	3,120	10,082
Drive Access Ferry	0	0	0	134	191	325	0	0	0	109	192	301

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
Home-Based Work	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Income Quartile 3												
Drive Alone	83,130	126,972	310,911	239,234	390,873	1,151,120	83,247	127,031	310,894	239,270	390,890	1,151,332
Shared Ride 2	17,985	18,251	38,837	35,397	53,921	164,390	17,999	18,259	38,831	35,400	53,922	164,411
Shared Ride 3+	5,760	5,822	11,039	13,305	21,559	57,484	5,764	5,824	11,037	13,305	21,560	57,491
Transit	59,477	18,045	16,101	37,521	34,645	165,788	59,444	17,967	16,114	37,464	34,619	165,607
Bike	4,523	1,283	3,871	3,593	2,846	16,116	4,514	1,284	3,872	3,596	2,847	16,112
Walk	16,066	3,594	5,265	6,720	8,392	40,037	15,963	3,596	5,267	6,723	8,392	39,941
Total	**186,940**	**173,966**	**386,024**	**335,771**	**512,235**	**1,594,936**	**186,931**	**173,961**	**386,014**	**335,757**	**512,231**	**1,594,894**
Transit Walk Access	58,407	10,769	9,609	22,392	20,675	121,852	58,464	10,772	9,306	22,251	20,593	121,385
Walk Access Bart	17,982	2,015	207	10,458	7,531	38,193	18,084	2,016	198	10,371	7,493	38,162
Walk Access Commuter Rail	454	1,379	1,025	204	76	3,138	454	1,377	988	202	75	3,096
Walk Access LRT	10,617	0	959	0	0	11,576	10,606	3	924	3	4	11,540
Walk Access Express Bus	4,186	2,852	1,535	2,322	2,542	13,437	4,172	2,850	1,484	2,309	2,529	13,343
Walk Access Local Bus	23,512	4,524	5,883	8,985	9,811	52,714	23,509	4,526	5,712	8,945	9,779	52,471
Walk Access Ferry	1,656	0	0	423	716	2,795	1,638	0	0	421	713	2,772
Transit Drive Access	1,069	7,276	6,492	15,129	13,969	43,936	980	7,195	6,808	15,213	14,026	44,222
Drive Access BART	760	1,378	142	7,135	5,145	14,560	684	1,392	146	7,225	5,174	14,621
Drive Access Commuter Rail	309	940	701	139	51	2,141	282	762	748	143	52	1,987
Drive Access LRT	0	0	655	0	0	655	0	0	703	1	0	704
Drive Access Express Bus	0	4,958	4,994	7,565	8,281	25,798	13	5,042	5,210	7,619	8,304	26,189
Drive Access Ferry	0	0	0	290	492	782	0	0	0	225	496	721

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
Home-Based Work	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Income Quartile 4												
Drive Alone	130,437	215,810	511,990	260,543	418,911	1,537,692	130,534	215,806	512,043	260,551	418,869	1,537,802
Shared Ride 2	26,388	24,315	59,959	36,018	49,473	196,154	26,391	24,319	59,961	36,026	49,480	196,177
Shared Ride 3+	7,872	7,626	12,549	15,436	20,187	63,669	7,872	7,628	12,550	15,440	20,191	63,680
Transit	70,871	21,899	18,145	43,346	43,443	197,704	70,870	21,893	18,073	43,318	43,469	197,623
Bike	4,410	1,806	6,079	3,299	2,986	18,579	4,407	1,806	6,082	3,298	2,985	18,578
Walk	16,527	2,938	5,106	5,397	9,908	39,876	16,428	2,939	5,107	5,393	9,906	39,773
Total	**256,505**	**274,394**	**613,828**	**364,039**	**544,908**	**2,053,674**	**256,501**	**274,391**	**613,816**	**364,026**	**544,900**	**2,053,633**
Transit Walk Access	69,667	13,430	11,128	26,582	26,642	147,448	69,465	13,443	10,871	26,630	26,662	147,071
Walk Access Bart	21,478	2,545	244	12,545	9,820	46,632	21,362	2,551	238	12,582	9,832	46,566
Walk Access Commuter Rail	561	1,737	1,203	244	98	3,843	556	1,737	1,176	245	98	3,812
Walk Access LRT	12,650	0	1,124	0	0	13,774	12,628	2	1,096	2	5	13,733
Walk Access Express Bus	5,021	3,560	1,785	2,751	3,276	16,392	5,025	3,552	1,743	2,758	3,290	16,369
Walk Access Local Bus	27,984	5,588	6,773	10,532	12,508	63,385	27,948	5,600	6,618	10,531	12,494	63,191
Walk Access Ferry	1,973	0	0	510	939	3,422	1,947	0	0	511	943	3,401
Transit Drive Access	1,204	8,469	7,017	16,764	16,801	50,256	1,404	8,451	7,202	16,688	16,807	50,552
Drive Access BART	855	1,572	150	7,780	6,075	16,431	1,002	1,587	154	7,789	6,051	16,583
Drive Access Commuter Rail	349	1,078	742	152	61	2,382	390	1,084	781	151	61	2,467
Drive Access LRT	0	0	696	0	0	696	0	0	728	1	0	729
Drive Access Express Bus	0	5,820	5,430	8,518	10,091	29,858	13	5,780	5,539	8,522	10,120	29,973
Drive Access Ferry	0	0	0	313	575	888	0	0	0	225	575	800

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
Home-Based Work	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Total												
Drive Alone	289,252	445,483	1,063,662	729,540	1,198,392	3,726,330	289,442	445,541	1,063,694	729,622	1,198,375	3,726,674
Shared Ride 2	59,638	58,364	134,884	111,735	167,383	532,004	59,640	58,378	134,879	111,750	167,389	532,036
Shared Ride 3+	19,428	18,812	34,165	45,976	67,111	185,492	19,426	18,818	34,163	45,980	67,115	185,502
Transit	209,981	54,528	53,066	137,183	117,398	572,157	209,971	54,456	53,001	137,047	117,382	571,856
Bike	14,475	4,787	17,438	13,316	10,296	60,311	14,450	4,787	17,442	13,320	10,296	60,295
Walk	67,915	13,110	22,141	32,512	36,317	171,995	67,737	13,088	22,138	32,484	36,316	171,764
Total	**660,689**	**595,085**	**1,325,356**	**1,070,262**	**1,596,897**	**5,248,289**	**660,666**	**595,068**	**1,325,317**	**1,070,203**	**1,596,874**	**5,248,127**
Transit Walk Access	207,012	35,836	35,864	94,654	78,991	452,358	206,658	35,889	35,337	94,355	78,863	451,101
Walk Access Bart	64,060	6,742	778	44,404	28,921	144,906	63,934	6,757	765	44,230	28,869	144,553
Walk Access Commuter Rail	1,837	4,608	3,846	865	290	11,446	1,830	4,614	3,786	862	289	11,382
Walk Access LRT	37,481	0	3,597	0	0	41,078	37,419	9	3,536	6	10	40,980
Walk Access Express Bus	15,036	9,493	5,738	9,807	9,713	49,788	15,027	9,488	5,652	9,774	9,699	49,640
Walk Access Local Bus	82,752	14,993	21,905	37,778	37,311	194,738	82,623	15,021	21,598	37,688	37,241	194,171
Walk Access Ferry	5,847	0	0	1,800	2,756	10,402	5,825	0	0	1,795	2,755	10,375
Transit Drive Access	2,969	18,692	17,202	42,529	38,407	119,799	3,313	18,567	17,664	42,692	38,519	120,755
Drive Access BART	2,110	3,510	373	19,920	14,032	39,945	2,351	3,533	381	20,128	14,062	40,455
Drive Access Commuter Rail	860	2,400	1,843	388	141	5,631	928	2,224	1,924	395	142	5,612
Drive Access LRT	0	0	1,723	0	0	1,723	0	0	1,800	2	0	1,802
Drive Access Express Bus	0	12,782	13,263	21,414	22,898	70,357	35	12,809	13,560	21,560	22,973	70,936
Drive Access Ferry	0	0	0	807	1,336	2,142	0	0	0	607	1,343	1,950
Total BART	**66,169**	**10,253**	**1,151**	**64,324**	**42,954**	**184,851**	**66,284**	**10,290**	**1,145**	**64,358**	**42,930**	**185,008**
Total Commuter Rail	**2,696**	**7,008**	**5,688**	**1,254**	**430**	**17,077**	**2,758**	**6,838**	**5,710**	**1,257**	**431**	**16,994**
Total LRT	**37,481**	**0**	**5,320**	**0**	**0**	**42,802**	**37,419**	**9**	**5,336**	**8**	**10**	**42,782**
Total Bus	**97,788**	**37,268**	**40,906**	**68,999**	**69,922**	**314,883**	**97,685**	**37,319**	**40,809**	**69,021**	**69,913**	**314,747**
Total Ferry	**5,847**	**0**	**0**	**2,606**	**4,091**	**12,545**	**5,825**	**0**	**0**	**2,402**	**4,098**	**12,325**
Total Transit	**209,981**	**54,528**	**53,066**	**137,183**	**117,398**	**572,157**	**209,971**	**54,456**	**53,001**	**137,047**	**117,382**	**571,856**

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
Home-Based	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Shopping												
Drive Alone	152,599	296,683	710,342	440,130	826,656	2,426,410	153,162	296,823	710,511	440,160	826,777	2,427,432
Shared Ride 2	84,413	138,767	413,022	274,631	420,964	1,331,796	84,725	138,587	413,115	274,641	421,016	1,332,084
Shared Ride 3+	41,943	85,165	253,501	151,030	244,831	776,470	42,100	85,197	253,547	151,034	244,870	776,747
Transit	107,062	10,089	30,395	37,719	15,480	200,744	108,321	10,066	30,084	37,681	15,275	201,427
Bike	1,496	3,079	8,109	9,625	8,648	30,957	1,499	3,080	8,110	9,625	8,649	30,963
Walk	134,718	54,820	49,979	112,109	80,567	432,193	134,937	54,851	49,983	112,105	80,564	432,440
Total	**522,232**	**588,603**	**1,465,347**	**1,025,244**	**1,597,146**	**5,198,572**	**524,743**	**588,603**	**1,465,350**	**1,025,245**	**1,597,151**	**5,201,092**
Transit Walk Access	105,965	9,503	28,630	35,529	14,581	194,210	106,635	9,550	28,417	35,497	14,539	194,638
Walk Access Bart	30,441	1,588	536	15,176	4,785	52,527	30,638	1,589	213	15,161	4,798	52,399
Walk Access Commuter Rail	1,238	1,115	2,721	304	49	5,427	1,248	1,133	2,727	304	49	5,461
Walk Access LRT	18,011	0	2,586	0	0	20,597	18,111	0	2,595	0	0	20,706
Walk Access Express Bus	8,110	2,496	4,410	3,743	1,794	20,553	8,154	2,504	4,429	3,736	1,789	20,611
Walk Access Local Bus	45,543	4,304	18,377	15,728	7,523	91,475	45,847	4,324	18,453	15,719	7,545	91,887
Walk Access Ferry	2,622	0	0	579	429	3,630	2,637	0	0	578	358	3,573
Transit Drive Access	1,097	586	1,764	2,189	899	6,535	1,686	515	1,667	2,184	737	6,789
Drive Access BART	1,019	102	35	969	307	2,432	1,638	91	32	975	275	3,011
Drive Access Commuter Rail	78	71	176	19	3	347	47	42	172	22	3	287
Drive Access LRT	0	0	166	0	0	166	0	0	160	0	0	160
Drive Access Express Bus	0	412	1,388	1,164	560	3,524	1	382	1,302	1,165	435	3,286
Drive Access Ferry	0	0	0	38	28	66	0	0	0	21	24	45

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
Home Based	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**	**San Francisco**	**San Mateo**	**Santa Clara**	**Alameda**	**Rest**	**Total**
Social/Recreation												
Drive Alone	70,840	119,728	234,878	158,605	274,131	858,181	70,785	122,777	234,602	158,598	274,119	860,880
Shared Ride 2	53,987	90,039	223,505	114,930	199,580	682,041	53,997	82,737	224,100	115,015	199,508	675,357
Shared Ride 3+	20,776	75,891	201,430	84,431	182,069	564,598	20,722	79,028	201,817	84,435	182,097	568,099
Transit	39,927	2,735	13,193	12,148	6,410	74,413	40,050	2,611	12,612	12,075	6,469	73,817
Bike	5,565	12,306	19,330	10,517	23,633	71,351	5,556	12,682	19,368	10,518	23,631	71,756
Walk	52,991	26,132	38,658	41,281	59,551	218,612	52,975	26,996	38,494	41,269	59,550	219,284
Total	**244,087**	**326,830**	**730,994**	**421,912**	**745,373**	**2,469,196**	**244,085**	**326,830**	**730,992**	**421,910**	**745,375**	**2,469,192**
Transit Walk Access	39,554	2,109	10,174	9,368	4,943	66,146	39,188	2,054	10,752	9,768	4,835	66,598
Walk Access Bart	11,200	353	191	4,005	1,624	17,372	10,795	362	194	4,193	1,615	17,160
Walk Access Commuter Rail	369	248	968	80	17	1,682	371	230	1,029	98	17	1,745
Walk Access LRT	6,771	0	920	0	0	7,691	6,795	0	1,250	0	0	8,045
Walk Access Express Bus	2,980	554	1,568	987	608	6,696	2,984	554	1,686	1,028	535	6,787
Walk Access Local Bus	17,278	954	6,527	4,143	2,548	31,451	17,289	908	6,593	4,296	2,518	31,604
Walk Access Ferry	955	0	0	153	146	1,254	954	0	0	153	150	1,257
Transit Drive Access	374	626	3,020	2,781	1,467	8,267	862	556	1,859	2,307	1,635	7,219
Drive Access BART	263	105	57	1,195	485	2,106	725	73	38	881	492	2,208
Drive Access Commuter Rail	110	74	289	24	5	502	136	57	129	11	6	339
Drive Access LRT	0	0	275	0	0	275	0	0	23	0	0	23
Drive Access Express Bus	0	447	2,399	1,516	933	5,295	0	426	1,669	1,396	1,089	4,581
Drive Access Ferry	0	0	0	46	44	89	0	0	0	20	48	68

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
	San Francisco	San Mateo	Santa Clara	Alameda	Rest	Total	San Francisco	San Mateo	Santa Clara	Alameda	Rest	Total
Nonhome-Based												
Vehicle Driver	351,671	536,212	1,221,485	786,274	1,098,284	3,993,927	352,731	536,190	1,221,454	786,219	1,098,233	3,994,826
Vehicle Passenger	88,758	115,828	262,099	169,678	275,399	911,762	88,990	115,820	262,089	169,660	275,391	911,951
Transit	91,423	2,515	23,093	27,790	8,033	152,854	91,839	2,546	23,135	27,843	8,069	153,432
Bike	5,229	6,750	14,175	13,418	9,273	48,846	5,235	6,750	14,175	13,419	9,273	48,851
Walk	383,482	37,746	81,891	106,288	103,868	713,275	381,769	37,747	81,893	106,305	103,887	711,601
Total	**920,563**	**699,051**	**1,602,744**	**1,103,448**	**1,494,858**	**5,820,664**	**920,563**	**699,052**	**1,602,747**	**1,103,446**	**1,494,853**	**5,820,661**
Transit Walk Access	90,854	2,137	19,625	23,616	6,827	143,059	91,517	2,095	19,561	23,327	6,685	143,185
Walk Access Bart	25,847	357	367	10,074	2,237	38,880	26,207	347	365	9,913	2,180	39,012
Walk Access Commuter Rail	931	250	1,862	202	23	3,268	955	241	1,849	198	22	3,264
Walk Access LRT	15,504	0	1,770	0	0	17,273	15,569	0	1,760	0	0	17,329
Walk Access Express Bus	6,889	561	3,021	2,488	840	13,800	6,951	551	3,005	2,455	819	13,781
Walk Access Local Bus	39,496	969	12,605	10,469	3,526	67,066	39,642	956	12,583	10,380	3,467	67,027
Walk Access Ferry	2,187	0	0	384	201	2,772	2,193	0	0	382	197	2,772
Transit Drive Access	569	378	3,468	4,174	1,206	9,795	322	451	3,574	4,516	1,384	10,247
Drive Access BART	402	65	67	1,821	406	2,761	232	89	71	2,036	483	2,910
Drive Access Commuter Rail	167	45	339	36	4	592	87	53	354	42	5	540
Drive Access LRT	0	0	321	0	0	321	0	0	334	0	0	335
Drive Access Express Bus	0	268	2,741	2,246	759	6,013	2	310	2,816	2,401	853	6,382
Drive Access Ferry	0	0	0	71	37	107	0	0	0	37	43	81

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
	San Francisco	San Mateo	Santa Clara	Alameda	Rest	Total	San Francisco	San Mateo	Santa Clara	Alameda	Rest	Total
Nonwork Total												
Drive Alone	223,438	416,411	945,220	598,735	1,100,787	3,284,591	223,947	419,599	945,113	598,757	1,100,896	3,288,312
Shared Ride 2	138,401	228,806	636,526	389,561	620,543	2,013,837	138,722	221,324	637,215	389,656	620,525	2,007,441
Shared Ride 3+	62,719	161,056	454,931	235,461	426,900	1,341,068	62,822	164,225	455,363	235,469	426,967	1,344,846
Vehicle Driver (NHB)	351,671	536,212	1,221,485	786,274	1,098,284	3,993,927	352,731	536,190	1,221,454	786,219	1,098,233	3,994,826
Vehicle Passenger (NHB)	88,758	115,828	262,099	169,678	275,399	911,762	88,990	115,820	262,089	169,660	275,391	911,951
Transit	238,412	15,339	66,681	77,657	29,923	428,012	240,210	15,223	65,831	77,599	29,814	428,676
Bike	12,291	22,135	41,615	33,560	41,554	151,154	12,289	22,512	41,652	33,562	41,553	151,569
Walk	571,192	118,697	170,527	259,678	243,986	1,364,081	569,681	119,593	170,370	259,678	244,002	1,363,324
Total	**1,686,882**	**1,614,484**	**3,799,085**	**2,550,604**	**3,837,377**	**13,488,432**	**1,689,392**	**1,614,486**	**3,799,088**	**2,550,600**	**3,837,380**	**13,490,945**
Transit Walk Access	236,373	13,749	58,429	68,513	26,350	403,415	237,340	13,700	58,731	68,592	26,058	404,421
Walk Access Bart	67,488	2,298	1,094	29,254	8,646	108,779	67,641	2,299	772	29,266	8,593	108,571
Walk Access Commuter Rail	2,538	1,613	5,552	586	89	10,378	2,574	1,604	5,605	599	88	10,470
Walk Access LRT	40,286	0	5,275	0	0	45,561	40,475	0	5,605	0	0	46,080
Walk Access Express Bus	17,978	3,612	8,999	7,217	3,243	41,049	18,089	3,609	9,120	7,219	3,142	41,179
Walk Access Local Bus	102,318	6,227	37,510	30,340	13,597	189,992	102,777	6,188	37,629	30,394	13,530	190,518
Walk Access Ferry	5,764	0	0	1,116	776	7,656	5,784	0	0	1,113	704	7,602
Transit Drive Access	2,040	1,589	8,252	9,144	3,572	24,597	2,870	1,523	7,100	9,007	3,755	24,256
Drive Access BART	1,684	273	159	3,985	1,198	7,299	2,596	252	141	3,891	1,249	8,129
Drive Access Commuter Rail	356	190	804	79	12	1,441	271	152	654	75	13	1,166
Drive Access LRT	0	0	761	0	0	761	0	0	518	0	0	518
Drive Access Express Bus	0	1,126	6,528	4,925	2,253	14,832	3	1,118	5,787	4,962	2,378	14,249
Drive Access Ferry	0	0	0	154	109	263	0	0	0	78	115	193
Total BART	**69,172**	**2,570**	**1,253**	**33,239**	**9,844**	**116,079**	**70,236**	**2,551**	**913**	**33,158**	**9,842**	**116,700**
Total Commuter Rail	**2,894**	**1,803**	**6,355**	**665**	**101**	**11,819**	**2,845**	**1,756**	**6,259**	**674**	**102**	**11,637**
Total LRT	**40,286**	**0**	**6,036**	**0**	**0**	**46,322**	**40,475**	**0**	**6,123**	**0**	**0**	**46,598**
Total Bus	**120,296**	**10,965**	**53,036**	**42,483**	**19,093**	**245,872**	**120,869**	**10,915**	**52,536**	**42,575**	**19,051**	**245,947**
Total Ferry	**5,764**	**0**	**0**	**1,270**	**885**	**7,919**	**5,784**	**0**	**0**	**1,192**	**819**	**7,795**
Total Transit	**238,412**	**15,339**	**66,681**	**77,657**	**29,923**	**428,012**	**240,210**	**15,223**	**65,831**	**77,599**	**29,814**	**428,676**

Table A.1 Year 2000 Target and Modeled Trips by Purpose, County, Mode, and Transit Submode (continued)

	Target						Modeled					
	San Francisco	San Mateo	Santa Clara	Alameda	Rest	Total	San Francisco	San Mateo	Santa Clara	Alameda	Rest	Total
Grand Total Work and Nonwork												
Drive Alone	512,690	861,894	2,008,882	1,328,276	2,299,180	7,010,921	513,389	865,140	2,008,808	1,328,379	2,299,270	7,014,986
Shared Ride 2	198,039	287,170	771,410	501,296	787,926	2,545,841	198,361	279,702	772,094	501,406	787,914	2,539,477
Shared Ride 3+	82,148	179,868	489,096	281,437	494,011	1,526,560	82,248	183,042	489,527	281,449	494,082	1,530,347
Vehicle Driver (NHB)	351,671	536,212	1,221,485	786,274	1,098,284	3,993,927	352,731	536,190	1,221,454	786,219	1,098,233	3,994,826
Vehicle Passenger (NHB)	88,758	115,828	262,099	169,678	275,399	911,762	88,990	115,820	262,089	169,660	275,391	911,951
Transit	448,394	69,867	119,747	214,840	147,320	1,000,168	450,181	69,678	118,832	214,646	147,196	1,000,533
Bike	26,765	26,922	59,053	46,876	51,850	211,465	26,739	27,300	59,094	46,882	51,849	211,864
Walk	639,106	131,808	192,669	292,190	280,304	1,536,076	637,418	132,682	192,507	292,162	280,318	1,535,088
Total	**2,347,571**	**2,209,569**	**5,124,441**	**3,620,866**	**5,434,274**	**18,736,721**	**2,350,057**	**2,209,553**	**5,124,405**	**3,620,803**	**5,434,253**	**18,739,072**
Transit Walk Access	443,385	49,586	94,293	163,168	105,342	855,772	443,998	49,588	94,068	162,946	104,921	855,522
Walk Access Bart	131,547	9,040	1,872	73,658	37,567	253,685	131,574	9,056	1,537	73,496	37,462	253,124
Walk Access Commuter Rail	4,375	6,221	9,397	1,451	379	21,823	4,404	6,218	9,391	1,461	378	21,852
Walk Access LRT	77,768	0	8,871	0	0	86,639	77,894	9	9,141	6	10	87,060
Walk Access Express Bus	33,014	13,105	14,737	17,024	12,956	90,837	33,116	13,097	14,772	16,993	12,842	90,819
Walk Access Local Bus	185,069	21,219	59,415	68,118	50,909	384,730	185,400	21,209	59,226	68,082	50,771	384,689
Walk Access Ferry	11,611	0	0	2,916	3,532	18,058	11,609	0	0	2,908	3,459	17,977
Transit Drive Access	5,009	20,281	25,454	51,673	41,979	144,396	6,182	20,090	24,764	51,700	42,274	145,011
Drive Access BART	3,794	3,783	532	23,905	15,231	47,244	4,946	3,786	521	24,020	15,311	48,584
Drive Access Commuter Rail	1,215	2,590	2,646	468	153	7,073	1,199	2,377	2,578	470	155	6,779
Drive Access LRT	0	0	2,485	0	0	2,485	0	0	2,318	3	0	2,320
Drive Access Express Bus	0	13,908	19,791	26,339	25,150	85,189	38	13,928	19,347	26,522	25,351	85,185
Drive Access Ferry	0	0	0	961	1,445	2,405	0	0	0	686	1,457	2,143
Total BART	**135,341**	**12,823**	**2,404**	**97,563**	**52,797**	**300,929**	**136,521**	**12,841**	**2,059**	**97,516**	**52,773**	**301,709**
Total Commuter Rail	**5,590**	**8,811**	**12,044**	**1,919**	**532**	**28,896**	**5,603**	**8,594**	**11,969**	**1,931**	**533**	**28,630**
Total LRT	**77,768**	**0**	**11,356**	**0**	**0**	**89,124**	**77,894**	**9**	**11,459**	**9**	**10**	**89,381**
Total Bus	**218,084**	**48,233**	**93,943**	**111,481**	**89,015**	**560,755**	**218,554**	**48,234**	**93,345**	**111,597**	**88,964**	**560,694**
Total Ferry	**11,611**	**0**	**0**	**3,877**	**4,976**	**20,464**	**11,609**	**0**	**0**	**3,594**	**4,916**	**20,120**
Total Transit	**448,394**	**69,867**	**119,747**	**214,840**	**147,320**	**1,000,168**	**450,181**	**69,678**	**118,832**	**214,646**	**147,196**	**1,000,533**

Appendix B

2000 County-to-County Person Trips from MTC

Table B.1 2000 County-to-County Person Trips from MTC

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/ Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
San Francisco	San Francisco	74,797	107,464	142,274	186,081	510,616	479,025	187,068	777,223	1,443,316	1,953,932
San Francisco	San Mateo	6,084	11,452	23,238	31,304	72,078	42,091	36,940	84,070	163,101	235,179
San Francisco	Santa Clara	1,188	4,319	5,784	14,242	25,533	104	1,822	7,315	9,241	34,774
San Francisco	Alameda	2,721	4,617	10,275	15,605	33,218	1,448	9,258	30,303	41,009	74,227
San Francisco	Contra Costa	471	1,188	2,092	4,114	7,865	319	3,580	9,496	13,395	21,260
San Francisco	Solano	14	55	170	308	547	10	313	1,126	1,449	1,996
San Francisco	Napa	17	23	47	276	363	1	56	447	504	867
San Francisco	Sonoma	42	111	118	635	906	10	243	1,294	1,547	2,453
San Francisco	Marin	960	1,721	2,942	3,940	9,563	1,735	4,807	9,289	15,831	25,394
San Mateo	San Francisco	7,786	20,723	39,894	56,238	124,641	73,985	43,023	88,122	205,130	329,771
San Mateo	San Mateo	30,666	61,547	100,283	136,718	329,214	479,048	244,682	527,877	1,251,607	1,580,821
San Mateo	Santa Clara	6,207	13,718	25,259	62,601	107,785	33,910	29,487	60,643	124,040	231,825
San Mateo	Alameda	1,530	3,385	6,758	16,035	27,708	1,081	6,814	15,335	23,230	50,938
San Mateo	Contra Costa	248	323	1,054	1,512	3,137	245	1,522	3,188	4,955	8,092
San Mateo	Solano	25	50	49	279	403	12	125	528	665	1,068
San Mateo	Napa	16	10	14	60	100	5	18	293	316	416
San Mateo	Sonoma	30	130	283	326	769	10	29	886	925	1,694
San Mateo	Marin	113	218	372	625	1,328	307	1,130	2,179	3,616	4,944
Santa Clara	San Francisco	987	1,989	4,670	6,231	13,877	5,348	4,073	7,438	16,859	30,736
Santa Clara	San Mateo	3,934	8,463	16,385	33,862	62,644	41,528	29,584	64,590	135,702	198,346
Santa Clara	Santa Clara	104,740	191,461	346,429	541,125	1,183,755	1,400,021	677,107	1,489,864	3,566,992	4,750,747
Santa Clara	Alameda	3,776	8,437	16,941	29,268	58,422	16,230	17,621	32,997	66,848	125,270
Santa Clara	Contra Costa	386	713	1,030	2,241	4,370	1,839	2,418	3,969	8,226	12,596
Santa Clara	Solano	40	127	210	333	710	67	71	636	774	1,484
Santa Clara	Napa	5	37	11	81	134	47	1	511	559	693
Santa Clara	Sonoma	57	65	163	192	477	88	0	1,819	1,907	2,384
Santa Clara	Marin	69	218	185	495	967	179	119	920	1,218	2,185

Table B.1 2000 County-to-County Person Trips from MTC (continued)

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/ Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
Alameda	San Francisco	17,800	27,355	38,794	50,817	134,766	17,643	11,409	23,297	52,349	187,115
Alameda	San Mateo	5,370	9,472	16,862	18,897	50,601	11,371	10,169	15,101	36,641	87,242
Alameda	Santa Clara	6,282	18,541	41,365	56,200	122,388	12,029	19,419	34,334	65,782	188,170
Alameda	Alameda	108,652	158,168	215,559	212,685	695,064	952,815	353,694	973,926	2,280,435	2,975,499
Alameda	Contra Costa	5,884	9,685	20,157	22,015	57,741	30,744	24,492	47,958	103,194	160,935
Alameda	Solano	203	440	852	881	2,376	217	1,331	3,319	4,867	7,243
Alameda	Napa	35	92	109	176	412	30	201	1,149	1,380	1,792
Alameda	Sonoma	179	210	537	533	1,459	43	182	2,132	2,357	3,816
Alameda	Marin	782	1,302	1,536	1,835	5,455	352	1,015	2,232	3,599	9,054
Contra Costa	San Francisco	7,787	16,994	28,440	39,756	92,977	7,114	5,362	9,405	21,881	114,858
Contra Costa	San Mateo	1,268	2,349	4,994	5,748	14,359	807	1,317	3,635	5,759	20,118
Contra Costa	Santa Clara	1,267	2,750	5,215	9,636	18,868	249	1,206	5,201	6,656	25,524
Contra Costa	Alameda	12,652	31,493	53,624	69,278	167,047	36,670	25,604	44,905	107,179	274,226
Contra Costa	Contra Costa	48,695	80,324	121,156	133,570	383,745	658,301	289,394	556,240	1,503,935	1,887,680
Contra Costa	Solano	801	1,932	3,563	3,597	9,893	7,271	6,036	10,852	24,159	34,052
Contra Costa	Napa	168	547	791	646	2,152	391	836	2,438	3,665	5,817
Contra Costa	Sonoma	87	375	437	333	1,232	151	263	2,181	2,595	3,827
Contra Costa	Marin	1,820	2,876	3,377	2,400	10,473	1,026	1,165	2,366	4,557	15,030
Solano	San Francisco	1,811	4,223	6,543	3,868	16,445	934	641	1,305	2,880	19,325
Solano	San Mateo	347	1,186	1,486	1,043	4,062	133	109	832	1,074	5,136
Solano	Santa Clara	873	889	857	872	3,491	26	14	1,539	1,579	5,070
Solano	Alameda	2,214	5,691	8,753	5,900	22,558	765	1,697	2,799	5,261	27,819
Solano	Contra Costa	3,432	8,336	16,028	11,586	39,382	8,857	6,587	9,141	24,585	63,967
Solano	Solano	25,329	37,983	48,615	35,278	147,205	265,391	112,263	212,165	589,819	737,024
Solano	Napa	2,889	4,780	6,269	4,178	18,116	1,163	556	1,348	3,067	21,183
Solano	Sonoma	447	1,224	1,459	985	4,115	82	312	1,392	1,786	5,901
Solano	Marin	1,492	1,922	2,812	1,753	7,979	312	713	1,163	2,188	10,167

Table B.1 2000 County-to-County Person Trips from MTC (continued)

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/ Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
Napa	San Francisco	394	460	828	949	2,631	280	90	421	791	3,422
Napa	San Mateo	130	249	109	404	892	62	10	434	506	1,398
Napa	Santa Clara	76	258	190	341	865	26	0	949	975	1,840
Napa	Alameda	196	578	753	865	2,392	193	296	872	1,361	3,753
Napa	Contra Costa	516	996	1,156	1,308	3,976	745	1,061	1,777	3,583	7,559
Napa	Solano	737	1,577	2,811	1,483	6,608	1,627	793	1,523	3,943	10,551
Napa	Napa	10,313	15,780	21,018	18,381	65,492	88,314	36,028	84,203	208,545	274,037
Napa	Sonoma	359	1,030	1,574	1,524	4,487	1,170	3,224	6,645	11,039	15,526
Napa	Marin	144	487	605	295	1,531	147	231	492	870	2,401
Sonoma	San Francisco	2,518	4,660	7,015	12,591	26,784	1,176	456	1,450	3,082	29,866
Sonoma	San Mateo	257	2,092	1,632	1,345	5,326	388	23	1,504	1,915	7,241
Sonoma	Santa Clara	232	321	1,125	757	2,435	198	0	3,373	3,571	6,006
Sonoma	Alameda	380	944	1,312	918	3,554	271	243	1,778	2,292	5,846
Sonoma	Contra Costa	207	378	775	1,176	2,536	325	359	1,512	2,196	4,732
Sonoma	Solano	156	473	1,062	580	2,271	175	364	938	1,477	3,748
Sonoma	Napa	444	1,116	1,543	1,461	4,564	3,581	3,686	6,567	13,834	18,398
Sonoma	Sonoma	42,263	69,701	94,549	68,234	274,747	329,422	149,302	292,655	771,379	1,046,126
Sonoma	Marin	2,186	6,187	9,655	6,824	24,852	868	2,277	2,432	5,577	30,429
Marin	San Francisco	2,753	4,687	11,343	29,533	48,316	6,279	6,636	11,240	24,155	72,471
Marin	San Mateo	182	768	1,088	4,410	6,448	353	995	2,594	3,942	10,390
Marin	Santa Clara	88	337	711	1,098	2,234	34	49	1,518	1,601	3,835
Marin	Alameda	523	1,157	1,969	4,679	8,328	171	645	1,215	2,031	10,359
Marin	Contra Costa	273	784	1,322	3,225	5,604	255	730	1,387	2,372	7,976
Marin	Solano	56	238	273	707	1,274	62	340	845	1,247	2,521
Marin	Napa	58	91	173	306	628	24	120	511	655	1,283
Marin	Sonoma	617	1,425	2,361	3,298	7,701	1,079	1,494	3,501	6,074	13,775
Marin	Marin	13,353	24,316	30,864	47,789	116,322	170,278	81,846	193,615	445,739	562,061
Total	**Total**	**584,886**	**1,014,793**	**1,594,936**	**2,053,674**	**5,248,289**	**5,201,083**	**2,469,196**	**5,820,664**	**13,490,943**	**18,739,232**

Table B.1 2000 County-to-County Person Trips from MTC (continued)

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/ Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
San Francisco	Total	86,294	130,950	186,940	256,505	660,689	524,743	244,087	920,563	1,689,393	2,350,082
San Mateo	Total	46,621	100,104	173,966	274,394	595,085	588,603	326,830	699,051	1,614,484	2,209,569
Santa Clara	Total	113,994	211,510	386,024	613,828	1,325,356	1,465,347	730,994	1,602,744	3,799,085	5,124,441
Alameda	Total	145,187	225,265	335,771	364,039	1,070,262	1,025,244	421,912	1,103,448	2,550,604	3,620,866
Contra Costa	Total	74,545	139,640	221,597	264,964	700,746	711,980	331,183	637,223	1,680,386	2,381,132
Solano	Total	38,834	66,234	92,822	65,463	263,353	277,663	122,892	231,684	632,239	895,592
Napa	Total	12,865	21,415	29,044	25,550	88,874	92,564	41,733	97,316	231,613	320,487
Sonoma	Total	48,643	85,872	118,668	93,886	347,069	336,404	156,710	312,209	805,323	1,152,392
Marin	Total	17,903	33,803	50,104	95,045	196,855	178,535	92,855	216,426	487,816	684,671
Total	**San Francisco**	**116,633**	**188,555**	**279,801**	**386,064**	**971,053**	**591,784**	**258,758**	**919,901**	**1,770,443**	**2,741,496**
Total	**San Mateo**	**48,238**	**97,578**	**166,077**	**233,731**	**545,624**	**575,781**	**323,829**	**700,637**	**1,600,247**	**2,145,871**
Total	**Santa Clara**	**120,953**	**232,594**	**426,935**	**686,872**	**1,467,354**	**1,446,597**	**729,104**	**1,604,736**	**3,780,437**	**5,247,791**
Total	**Alameda**	**132,644**	**214,470**	**315,944**	**355,233**	**1,018,291**	**1,009,644**	**415,872**	**1,104,130**	**2,529,646**	**3,547,937**
Total	**Contra Costa**	**60,112**	**102,727**	**164,770**	**180,747**	**508,356**	**701,630**	**330,143**	**634,668**	**1,666,441**	**2,174,797**
Total	**Solano**	**27,361**	**42,875**	**57,605**	**43,446**	**171,287**	**274,832**	**121,636**	**231,932**	**628,400**	**799,687**
Total	**Napa**	**13,945**	**22,476**	**29,975**	**25,565**	**91,961**	**93,556**	**41,502**	**97,467**	**232,525**	**324,486**
Total	**Sonoma**	**44,081**	**74,271**	**101,481**	**76,060**	**295,893**	**332,055**	**155,049**	**312,505**	**799,609**	**1,095,502**
Total	**Marin**	**20,919**	**39,247**	**52,348**	**65,956**	**178,470**	**175,204**	**93,303**	**214,688**	**483,195**	**661,665**

Appendix C

2030 County-to-County Person Trips from MTC

Table C.1 2030 County-to-County Person Trips from MTC

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
San Francisco	San Francisco	43,477	96,793	163,911	263,109	567,290	611,837	233,561	967,727	1,813,125	2,380,415
San Francisco	San Mateo	2,008	8,654	24,071	45,489	80,221	40,777	43,882	101,621	186,279	266,501
San Francisco	Santa Clara	38	708	2,956	19,975	23,678	20	1,430	7,822	9,272	32,949
San Francisco	Alameda	1,336	3,566	10,402	18,544	33,848	6,661	13,602	37,666	57,928	91,777
San Francisco	Contra Costa	378	1,432	2,785	4,419	9,014	2,228	5,246	10,714	18,187	27,201
San Francisco	Solano	52	124	273	196	646	361	471	1,305	2,137	2,782
San Francisco	Napa	93	48	65	178	382	42	111	476	629	1,011
San Francisco	Sonoma	241	245	330	350	1,166	416	469	1,218	2,102	3,268
San Francisco	Marin	837	4,009	3,965	5,551	14,362	2,571	5,858	9,441	17,869	32,231
San Mateo	San Francisco	4,449	20,543	53,792	85,088	163,872	102,990	52,523	104,016	259,528	423,400
San Mateo	San Mateo	12,918	53,418	123,144	209,420	398,900	622,470	299,220	664,215	1,585,905	1,984,805
San Mateo	Santa Clara	601	4,126	16,851	76,193	97,771	34,310	29,834	73,868	138,013	235,784
San Mateo	Alameda	1,156	2,746	7,052	17,355	28,309	4,875	9,286	18,212	32,374	60,682
San Mateo	Contra Costa	298	445	1,272	1,370	3,386	2,274	2,202	3,547	8,024	11,410
San Mateo	Solano	151	126	79	156	511	500	172	632	1,304	1,815
San Mateo	Napa	126	21	20	31	198	93	34	309	436	634
San Mateo	Sonoma	590	467	992	176	2,226	472	42	1,029	1,542	3,768
San Mateo	Marin	241	563	929	699	2,432	721	1,423	2,377	4,521	6,953
Santa Clara	San Francisco	7,335	10,651	12,706	7,742	38,434	25,718	5,951	8,039	39,707	78,141
Santa Clara	San Mateo	12,616	21,935	32,439	46,247	113,236	70,860	42,098	72,973	185,931	299,167
Santa Clara	Santa Clara	72,729	206,625	443,347	757,688	1,480,389	1,816,088	874,879	1,809,645	4,500,612	5,981,000
Santa Clara	Alameda	14,242	25,759	34,268	33,627	107,895	66,178	25,929	36,291	128,398	236,294
Santa Clara	Contra Costa	7,066	5,138	2,437	1,608	16,250	39,587	3,659	3,858	47,104	63,354
Santa Clara	Solano	4,500	2,117	808	119	7,544	9,048	60	894	10,002	17,546
Santa Clara	Napa	601	663	39	24	1,326	3,618	1	587	4,206	5,532
Santa Clara	Sonoma	1,637	943	154	6	2,740	23,792	0	2,441	26,233	28,972
Santa Clara	Marin	1,255	688	325	32	2,301	1,971	81	1,202	3,253	5,555

Table C.1 2030 County-to-County Person Trips from MTC

Residence County	Nonresidence County	Home-Based Work Person Trips: Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Nonwork Person Trips: Home-Based Shop/Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
Alameda	San Francisco	15,693	41,230	75,966	123,329	256,218	8,720	12,397	28,135	49,253	305,470
Alameda	San Mateo	2,435	8,342	23,772	36,358	70,907	5,647	12,928	21,622	40,197	111,103
Alameda	Santa Clara	305	4,711	30,137	111,001	146,153	5,086	19,427	46,801	71,314	217,467
Alameda	Alameda	77,463	191,778	338,822	411,218	1,019,281	1,290,250	467,731	1,317,700	3,075,681	4,094,962
Alameda	Contra Costa	6,334	13,617	33,009	36,724	89,684	73,626	34,320	59,698	167,644	257,328
Alameda	Solano	751	1,711	1,942	757	5,160	4,530	1,967	4,312	10,809	15,969
Alameda	Napa	287	277	216	137	917	497	381	1,409	2,286	3,203
Alameda	Sonoma	3,143	678	2,043	280	6,143	1,179	209	2,598	3,986	10,129
Alameda	Marin	2,042	2,566	3,132	2,303	10,043	325	1,029	2,265	3,620	13,664
Contra Costa	San Francisco	2,266	11,974	34,309	81,344	129,893	1,070	4,776	11,854	17,699	147,592
Contra Costa	San Mateo	172	1,049	4,195	10,963	16,378	80	1,212	5,279	6,571	22,949
Contra Costa	Santa Clara	9	236	2,045	15,453	17,743	8	798	6,860	7,666	25,409
Contra Costa	Alameda	4,666	23,285	62,886	124,201	215,037	30,047	28,817	59,070	117,934	332,970
Contra Costa	Contra Costa	36,232	107,666	210,760	275,574	630,232	949,176	415,275	833,706	2,198,158	2,828,389
Contra Costa	Solano	849	3,507	6,330	3,664	14,350	18,871	7,571	15,429	41,870	56,220
Contra Costa	Napa	509	983	1,285	630	3,408	1,157	1,454	3,453	6,064	9,472
Contra Costa	Sonoma	620	763	1,313	198	2,894	923	355	3,011	4,289	7,183
Contra Costa	Marin	2,664	4,451	6,436	3,164	16,715	304	1,118	2,401	3,824	20,539
Solano	San Francisco	124	1,922	7,447	19,311	28,803	50	497	1,985	2,531	31,335
Solano	San Mateo	14	616	1,733	5,189	7,552	9	80	1,557	1,646	9,198
Solano	Santa Clara	2	85	390	2,765	3,241	1	5	2,732	2,737	5,979
Solano	Alameda	132	2,231	8,769	24,346	35,477	116	1,700	4,242	6,057	41,535
Solano	Contra Costa	380	3,609	15,447	30,135	49,571	5,921	8,618	13,591	28,130	77,701
Solano	Solano	20,867	57,481	98,919	97,735	275,001	420,998	176,757	347,261	945,016	1,220,017
Solano	Napa	2,997	6,248	12,200	12,590	34,035	1,771	1,183	2,666	5,619	39,654
Solano	Sonoma	961	1,791	3,885	1,617	8,255	325	474	2,230	3,029	11,284
Solano	Marin	396	1,568	4,312	5,088	11,363	39	667	1,653	2,358	13,721

Table C.1 2030 County-to-County Person Trips from MTC

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
Napa	San Francisco	17	183	896	3,570	4,666	14	51	581	647	5,313
Napa	San Mateo	4	102	92	1,481	1,678	2	7	681	690	2,369
Napa	Santa Clara	0	16	79	1,375	1,469	0	0	1,288	1,288	2,757
Napa	Alameda	6	183	673	2,946	3,808	31	295	1,245	1,570	5,378
Napa	Contra Costa	44	786	2,957	6,311	10,098	370	1,348	2,693	4,412	14,509
Napa	Solano	433	2,672	6,492	3,832	13,430	3,354	1,242	3,069	7,666	21,096
Napa	Napa	6,028	18,428	33,760	33,822	92,037	117,176	48,594	113,513	279,283	371,320
Napa	Sonoma	365	1,371	4,100	3,167	9,002	2,574	4,810	7,957	15,341	24,343
Napa	Marin	25	392	900	835	2,153	17	201	669	887	3,039
Sonoma	San Francisco	17	506	1,723	6,114	8,360	61	268	2,350	2,679	11,039
Sonoma	San Mateo	4	92	294	1,701	2,090	17	15	2,441	2,472	4,562
Sonoma	Santa Clara	0	8	129	1,434	1,572	3	0	4,658	4,661	6,232
Sonoma	Alameda	6	191	426	2,200	2,824	41	161	2,671	2,872	5,696
Sonoma	Contra Costa	6	121	324	2,119	2,570	124	237	2,232	2,593	5,163
Sonoma	Solano	23	346	681	584	1,633	284	303	1,558	2,144	3,777
Sonoma	Napa	87	623	704	1,257	2,672	2,001	3,265	8,467	13,733	16,405
Sonoma	Sonoma	29,731	87,746	162,511	149,383	429,370	442,364	201,372	424,105	1,067,841	1,497,212
Sonoma	Marin	278	5,603	9,964	19,294	35,139	138	1,811	4,217	6,167	41,305
Marin	San Francisco	289	1,454	6,070	41,778	49,591	2,982	6,549	14,484	24,015	73,607
Marin	San Mateo	11	130	315	6,361	6,817	86	931	3,373	4,390	11,207
Marin	Santa Clara	0	11	113	1,346	1,470	1	30	1,814	1,845	3,316
Marin	Alameda	45	357	1,111	6,430	7,944	206	692	1,457	2,355	10,299
Marin	Contra Costa	50	356	873	3,948	5,227	650	857	1,707	3,213	8,441
Marin	Solano	51	199	207	457	915	600	393	1,036	2,028	2,943
Marin	Napa	66	64	119	174	423	150	171	556	877	1,300
Marin	Sonoma	265	2,850	4,102	8,081	15,298	8,486	2,752	3,571	14,810	30,108
Marin	Marin	6,983	22,540	43,018	77,671	150,213	210,966	97,954	236,151	545,071	695,284
Total	**Total**	**418,117**	**1,114,255**	**2,213,741**	**3,419,135**	**7,165,248**	**7,103,898**	**3,228,074**	**7,594,184**	**17,926,156**	**25,091,404**

Table C.1 2030 County-to-County Person Trips from MTC

		Home-Based Work Person Trips					Nonwork Person Trips				
Residence County	Nonresidence County	Income Quartile 1	Income Quartile 2	Income Quartile 3	Income Quartile 4	Total Work	Home-Based Shop/Other	Home-Based Social/ Recreation	Nonhome-Based	Total Nonwork	Total Trips
San Francisco	Total	48,461	115,579	208,757	357,810	730,607	664,912	304,629	1,137,988	2,107,529	2,838,136
San Mateo	Total	20,530	82,455	204,130	390,489	697,604	768,704	394,736	868,206	2,031,646	2,729,250
Santa Clara	Total	121,980	274,518	526,523	847,094	1,770,115	2,056,860	952,657	1,935,928	4,945,445	6,715,560
Alameda	Total	108,452	264,909	509,039	722,106	1,604,506	1,389,860	550,388	1,484,541	3,424,789	5,029,295
Contra Costa	Total	47,986	153,914	329,559	515,190	1,046,649	1,001,636	461,376	941,062	2,404,074	3,450,723
Solano	Total	25,873	75,550	153,101	198,775	453,299	429,230	189,979	377,916	997,125	1,450,424
Napa	Total	6,922	24,133	49,948	57,338	138,341	123,538	56,549	131,695	311,782	450,123
Sonoma	Total	30,151	95,236	176,756	184,086	486,229	445,032	207,430	452,700	1,105,162	1,591,391
Marin	Total	7,762	27,961	55,928	146,247	237,898	224,126	110,330	264,148	598,604	836,502
Total	**San Francisco**	**73,666**	**185,255**	**356,820**	**631,385**	**1,247,126**	**753,442**	**316,572**	**1,139,171**	**2,209,185**	**3,456,311**
Total	**San Mateo**	**30,181**	**94,336**	**210,053**	**363,209**	**697,779**	**739,947**	**400,372**	**873,762**	**2,014,081**	**2,711,860**
Total	**Santa Clara**	**73,685**	**216,525**	**496,047**	**987,229**	**1,773,487**	**1,855,517**	**926,402**	**1,955,488**	**4,737,407**	**6,510,893**
Total	**Alameda**	**99,052**	**250,096**	**464,408**	**640,866**	**1,454,422**	**1,398,404**	**548,213**	**1,478,553**	**3,425,169**	**4,879,591**
Total	**Contra Costa**	**50,789**	**133,172**	**269,863**	**362,208**	**816,032**	**1,073,957**	**471,762**	**931,745**	**2,477,464**	**3,293,496**
Total	**Solano**	**27,676**	**68,282**	**115,731**	**107,499**	**319,189**	**458,545**	**188,934**	**375,497**	**1,022,976**	**1,342,165**
Total	**Napa**	**10,794**	**27,354**	**48,408**	**48,843**	**135,399**	**126,505**	**55,192**	**131,434**	**313,132**	**448,530**
Total	**Sonoma**	**37,552**	**96,854**	**179,429**	**163,259**	**477,094**	**480,530**	**210,483**	**448,159**	**1,139,172**	**1,616,266**
Total	**Marin**	**14,723**	**42,381**	**72,981**	**114,637**	**244,721**	**217,052**	**110,143**	**260,375**	**587,570**	**832,291**